STATE OF SOUTH DAKOTA
OFFICE OF PROCUREMENT MANAGEMENT
523 EAST CAPITOL AVENUE
PIERRE, SOUTH DAKOTA 57501-3182

Emergency Services IP Network, Statewide Host Remote Call Answering System and Managed Services
PROPOSALS ARE DUE NO LATER THAN Date XX, 2014

RFP #: BUYER: Lisa Hubbard EMAIL Lisa.Hubbard@state.sd.us

Comment [a1]: Insert RFP #

READ CAREFULLY

FIRM NAME: _____ AUTHORIZED SIGNATURE: _____

ADDRESS: _____ TYPE OR PRINT NAME: _____

CITY/STATE: _____ TELEPHONE NO: _____

ZIP (9 DIGIT): _____ FAX NO: _____

FEDERAL TAX ID#: _____ E-MAIL: _____

PRIMARY CONTACT INFORMATION

CONTACT NAME: _____ TELEPHONE NO: _____

FAX NO: _____ E-MAIL: _____

1.0 GENERAL INFORMATION

1.1 PURPOSE OF REQUEST FOR PROPOSAL (RFP)

The Department of Public Safety (DPS) on behalf of the State 9-1-1 Coordination Board invites vendors with documented expertise and experience to submit proposals for a qualified and cost-effective/leased equipment and services solution to provide a National Emergency Number Association (NENA) i3-compliant Next Generation 9-1-1 (NG9-1-1) network and emergency call answering system interconnecting Public Safety Answering Points (PSAPs) across the State. Based on DPS's evaluation of proposals, DPS may enter into negotiations with one or more qualified Offeror(s).

South Dakota's current local emergency call taking environment is antiquated and, in several cases, in need of replacement due to end-of-life system constraints. Built on legacy technology, the current environment is unable to keep pace with the technology to place a 9-1-1 call. Such calls could be in the form of text, video or other media. With 29 locally operated PSAPs and four on Indian Reservations, the Board intends to move forward with a comprehensive solution to provide service based on the latest technology with the ability to increase that service as technology continues to change the face of placing an emergency call.

In support of the South Dakota State 9-1-1 Master Plan this Request for Proposals (RFP) seeks to procure the services and leased equipment of a service provider(s) to provide 1) the network backbone, all related technology hardware and software and connection points to transport emergency calls from the point of call ingress to the call taker workstation; 2) a host/remote call answering system; and 3) managed network services.

An Offeror may propose on a single portion or all portions.

1.2 ISSUING OFFICE AND REQUEST FOR PROPOSAL REFERENCE NUMBER

The State Bureau of Administration, Office of Procurement Management is the issuing office for this document and all subsequent addenda relating to it, on behalf of the State of South Dakota, DPS. The reference number for the transaction is RFP # . This number must be referred to on all proposals, correspondence, and documentation relating to the RFP.

Comment [a2]: Insert RFP #.

1.3 SCHEDULE OF ACTIVITIES (SUBJECT TO CHANGE)

RFP Publication	December 5, 2013
Deadline for Submission of Written Inquiries	December 19, 2013
Responses to Offeror Questions	December 31, 2013
Proposal Submission	February 14, 2013
Oral Presentations/discussions (if required)	January 28, 2014
Proposal Revisions (if required)	February 7, 2014
Anticipated Award Decision/Contract Negotiation	February 14, 2014

Comment [TR3]: Six weeks….Feb 14, 2014

Comment [TR4]: One day, a series???

Comment [TR5]: Two weeks after above?

Comment [TR6]: Begin contract negotiations March 1?

1.4 SUBMITTING YOUR PROPOSAL

All proposals must be completed and received in the Office of Procurement Management by the date and time indicated in the Schedule of Activities. Proposals received after the deadline will be deemed nonresponsive and ineligible for consideration.

Technical Proposal

One original and identical printed copies of the technical proposal shall be submitted in a separate sealed envelope, as well as XX digital copies on CD, thumb drive or similar media capable of review with a format providing the ability to insert comments (mark-up) within the provided documents.

Comment [a7]: Indicate how many copies you would like.

Cost Proposal

The cost proposal must be submitted in a separate sealed envelope and labeled "Cost Proposal".

One original and XX identical printed copies of the cost proposal shall be submitted in a separate sealed envelope. The cost proposal must contain the signature of a duly authorized officer and must be signed in ink.

Comment [MAJ8]: Blue ink?

All proposals must be signed, in ink, by an authorized representative to bind the Offeror to the proposal, and sealed in the form intended by the Offeror. Proposals that are not properly signed may be rejected. The sealed envelope must be marked with the appropriate RFP Number and Title. The words "Sealed Proposal Enclosed" must be prominently denoted on the outside of the shipping container. **Proposals must be addressed and labeled as follows:**

Comment [MAJ9]: Blue ink?

REQUEST FOR PROPOSAL #
PROPOSAL DUE December 30, 2013
BUYER

Comment [a10]: Insert RFP #

Comment [a11]: Insert Buyer Name

Comment [a12]: Insert agency name and address

All uppercase letters and no punctuation are to be used in the address. The address as displayed should be the only information in the address field.

Comment [a13]: Agency Name

No proposal shall be accepted from, or no contract or purchase order shall be awarded to any person, firm or corporation that is in arrears upon any obligations to the State of South Dakota, or that otherwise may be deemed irresponsible or unreliable by the State of South Dakota.

1.5 CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION – LOWER TIER COVERED TRANSACTIONS

By signing and submitting this proposal, the Offeror certifies that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible or voluntarily excluded from participation, by any Federal department or agency, from transactions involving the use of Federal funds. Where the Offeror is unable to certify to any of the statements in this certification, the Offeror shall attach an explanation to their offer.

1.6 NON-DISCRIMINATION STATEMENT

The State of South Dakota requires that all consultants, service providers, vendors, and suppliers doing business with any State agency, department, or institution, provide a statement of non-discrimination. By signing and submitting their proposal, the Offeror certifies they do not discriminate in their employment practices with regard to race, color, creed, religion, age, sex, ancestry, national origin or disability.

1.7 MODIFICATION OR WITHDRAWAL OF PROPOSALS

Proposals may be modified or withdrawn by the Offeror prior to the established due date and time.

No oral, email, telephonic, telegraphic or facsimile responses or modifications to informal, formal bids or Request for Proposals will be considered.

1.8 OFFEROR INQUIRIES

Offerors may email inquiries concerning this RFP to obtain clarification of requirements. No inquiries will be accepted after the date and time indicated in the Schedule of Activities. Inquiries must be emailed to [ ] at [ ] with the subject line "RFP #[ ]".

Comment [a14]: Insert Buyer Name

Comment [a15]: Insert Buyer email.

Comment [a16]: Insert RFP Number

A copy of inquiries received and the State's response will be posted on the State's e-procurement system. Offerors may not rely on any other statements, either of a written or oral nature, that alter any specification or other term or condition of this RFP. Offerors will be notified in the same manner as indicated above regarding any modifications to this RFP.

1.9 PROPRIETARY INFORMATION

The proposal of the successful Offeror(s) becomes public information. Proprietary information can be protected under limited circumstances such as client lists and non-public financial statements. Pricing and service elements are not considered proprietary. An entire proposal may not be marked as proprietary. Offerors must clearly identify in the Executive Summary and mark in the body of the proposal any specific proprietary information they are requesting to be protected. The Executive Summary must contain specific justification explaining why the information is to be protected. Proposals may be reviewed and evaluated by any person at the discretion of the State. All materials submitted become the property of the State of South Dakota and may be returned only at the State's discretion.

1.10 LENGTH OF CONTRACT

The Service provider(s) will provide professional services to the DPS, working directly with the State 9-1-1 Coordinator and the State 9-1-1 Coordination Board for up to five years with the option to renew for up to five additional years.

1.11 GOVERNING LAW

Venue for any and all legal action regarding or arising out of the transaction covered herein shall be solely in the State of South Dakota. The laws of South Dakota shall govern this transaction.

1.12 DISCUSSIONS WITH OFFERORS (ORAL PRESENTATION/NEGOTIATIONS)

An oral presentation by an Offeror to clarify a proposal may be required at the sole discretion of the State. However, the State may award a contract based on the initial proposals received without discussion with the Offeror. If oral presentations are required, they will be scheduled after the submission of proposals. Oral presentations will be made at the Offeror's expense.

This process is a Request for Proposal/Competitive Negotiation process. Each Proposal shall be evaluated, and each respondent shall be available for negotiation meetings at the State's request. The State reserves the right to negotiate on any and/or all components of every proposal submitted. From the time the proposals are submitted until the formal award of a contract, each proposal is considered a working document and as such, will be kept confidential. The negotiation discussions will also be held as confidential until such time as the award is completed.

END OF SECTION

2.0 STANDARD CONTRACT TERMS AND CONDITIONS

Any contract or agreement resulting from this RFP will include the State's standard terms and conditions as listed below, along with any additional terms and conditions as negotiated by the parties:

2.1 The Service provider will perform those services described in the Scope of Work, attached hereto as Section 3 of the RFP and by this reference incorporated herein.

2.2 The Service provider's services/leases under this Agreement shall commence on _____ and end on _____, unless sooner terminated pursuant to the terms hereof.

2.3 The Service provider will not use State equipment, supplies or facilities. The Service provider will provide the State with its Employer Identification Number, Federal Tax Identification Number or Social Security Number upon execution of this Agreement.

2.4 The State will make payment for services and/or leases upon satisfactory completion of the services and terms described in the lease agreement. The TOTAL CONTRACT AMOUNT is an amount not to exceed $_____. The State will not pay Service provider's expenses as a separate item. Payment will be made pursuant to itemized invoices submitted with a signed state voucher. Payment will be made consistent with SDCL ch. 5-26.

2.5 The Service provider agrees to indemnify and hold the State of South Dakota, its officers, agents and employees, harmless from and against any and all actions, suits, damages, liability or other proceedings that may arise as the result of performing services hereunder. This section does not require the Service provider to be responsible for or defend against claims or damages arising solely from errors or omissions of the State, its officers, agents or employees.

2.6 The Service provider, at all times during the term of this Agreement, shall obtain and maintain in force insurance coverage of the types and with the limits as follows:

A. Commercial General Liability Insurance:

The Service provider shall maintain occurrence based commercial general liability insurance or equivalent form with a limit of not less than $1,000,000.00 for each occurrence. If such insurance contains a general aggregate limit it shall apply separately to this Agreement or be no less than two times the occurrence limit.

B. Professional Liability Insurance or Miscellaneous Professional Liability Insurance:

The Service provider agrees to procure and maintain professional liability insurance or miscellaneous professional liability insurance with a limit not less than $1,000,000.00.

C. Business Automobile Liability Insurance:

The Service provider shall maintain business automobile liability insurance or equivalent form with a limit of not less than $1,000,000.00 for each accident. Such insurance shall include coverage for owned, hired and non-owned vehicles.

D. Worker's Compensation Insurance:

The Service provider shall procure and maintain workers' compensation and employers' liability insurance as required by South Dakota law.

Before beginning work under this Agreement, Service provider shall furnish the State with properly executed Certificates of Insurance which shall clearly evidence all insurance required in this Agreement. In the event a substantial change in insurance, issuance of a new policy, cancellation or nonrenewal of the policy, the Service provider agrees to provide immediate notice to the State and provide a new certificate of insurance showing continuous coverage in the amounts required. Service provider shall furnish copies of insurance policies if requested by the State.

2.7 While performing services hereunder, the Service provider is an independent Service provider and not an officer, agent, or employee of the State of South Dakota.

2.8 Service provider agrees to report to the State any event encountered in the course of performance of this Agreement which results in injury to the person or property of third parties, or which may otherwise subject Service provider or the State to liability. Service provider shall report any such event to the State immediately upon discovery.

Service provider's obligation under this section shall only be to report the occurrence of any event to the State and to make any other report provided for by their duties or applicable law. Service provider's obligation to report shall not require disclosure of any information subject to privilege or confidentiality under law (e.g., attorney-client communications). Reporting to the State under this section shall not excuse or satisfy any obligation of Service provider to report any event to law enforcement or other entities under the requirements of any applicable law.

2.9 This Agreement may be terminated by either party hereto upon thirty (30) days written notice. In the event the Service provider breaches any of the terms or conditions hereof, this Agreement may be terminated by the State at any time with or without notice. If termination for such a default is effected by the State, any payments due to Service provider at the time of termination may be adjusted to cover any additional costs to the State because of Service provider's default. Upon termination the State may take over the work and may award another party an agreement to complete the work under this Agreement. If after the State terminates for a default by Service provider it is determined that Service provider was not at fault, then the Service provider shall be paid for eligible services rendered and expenses incurred up to the date of termination.

2.10 This Agreement depends upon the continued availability of appropriated funds and expenditure authority from the Legislature for this purpose. If for any reason the Legislature fails to appropriate funds or grant expenditure authority, or funds become unavailable by operation of law or federal funds reductions, this Agreement will be terminated by the State. Termination for any of these reasons is not a default by the State nor does it give rise to a claim against the State.

2.11 This Agreement may not be assigned without the express prior written consent of the State. This Agreement may not be amended except in writing, which writing shall be expressly identified as a part hereof, and be signed by an authorized representative of each of the parties hereto.

2.12 This Agreement shall be governed by and construed in accordance with the laws of the State of South Dakota. Any lawsuit pertaining to or affecting this Agreement shall be venued in Circuit Court, Sixth Judicial Circuit, Hughes County, South Dakota.

2.13 The Service provider will comply with all federal, state and local laws, regulations, ordinances, guidelines, permits and requirements applicable to providing services pursuant to this Agreement, and will be solely responsible for obtaining current information on such requirements.

2.14 The Service provider may not use subcontractors to perform the services described herein without the express prior written consent of the State. The Service provider will include provisions in its subcontracts requiring its subcontractors to comply with the applicable provisions of this Agreement, to indemnify the State, and to provide insurance coverage for the benefit of the State in a manner consistent with this Agreement. The Service provider will cause its subcontractors, agents, and employees to comply, with applicable federal, state and local laws, regulations, ordinances, guidelines, permits and requirements and will adopt such review and inspection procedures as are necessary to assure such compliance.

2.15 Service provider hereby acknowledges and agrees that all reports, plans, specifications, technical data, miscellaneous drawings, software system programs and documentation, procedures, or files, operating instructions and procedures, source code(s) and documentation, including those necessary to upgrade and maintain the software program, and all information contained therein provided to the State by the Service provider in connection with its performance of services under this Agreement shall belong to and is the property of the State and will not be used in any way by the Service provider without the written consent of the State. Papers, reports, forms, software programs, source code(s) and other material which are a part of the work under this Agreement will not be copyrighted without written approval of the State.

2.16 The Service provider certifies that neither Service provider nor its principals are presently debarred, suspended, proposed for debarment or suspension, or declared ineligible from participating in transactions by the federal government or any state or local government department or agency. Service provider further agrees that it will immediately notify the State if during the term of this Agreement the Service provider or its principals become subject to debarment, suspension or ineligibility from participating in transactions by the federal government, or by any state or local government department or agency.

2.17 Any notice or other communication required under this Agreement shall be in writing and sent to the address set forth above. Notices shall be given by and to _____ on behalf of the State, and by _____, on behalf of the Service provider, or such authorized designees as either party may from time to time designate in writing. Notices or communications to or between the parties shall be deemed to have been delivered when mailed by first class mail, provided that notice of default or termination shall be sent by registered or certified mail, or, if personally delivered, when received by such party.

2.18 In the event that any court of competent jurisdiction shall hold any provision of this Agreement unenforceable or invalid, such holding shall not invalidate or render unenforceable any other provision hereof.

2.19 All other prior discussions, communications and representations concerning the subject matter of this Agreement are superseded by the terms of this Agreement, and except as specifically provided herein, this Agreement constitutes the entire agreement with respect to the subject matter hereof.

END OF SECTION

3.0 SCOPE OF WORK

Background

South Dakota is the sixteenth largest state in terms of size, encompassing 77,123 square miles with a population of approximately 833,000 in 66 counties. Its population includes several Native American tribes which account for roughly 8.3 percent of the population. South Dakota's two largest cities are Sioux Falls and Rapid City respectively. South Dakota contains 29 locally operated PSAPs. There are also four tribal PSAPs on Indian Reservations that are independent of the State.

Three of the Indian Reservations in South Dakota may remain without Enhanced 9-1-1 (E9-1-1) services (Cheyenne River, Pine Ridge and Rosebud). Some tribal entities have enacted their own 9-1-1 surcharges. No portion of any 9-1-1 surcharge collected on these reservations is remitted to the State. South Dakota Indian reservations are not part of the State system. They are independent of the State but may participate at their discretion.

South Dakota's preferred solution for a Statewide 9-1-1 call answering system for all PSAPs is a highly redundant leased host/remote configuration. In this scenario, South Dakota will have a minimum of two next generation i3 compliant host controller systems at geo-diverse locations. Each host controller system will be redundant within itself. The host controllers will then be configured to connect directly to each remote PSAP or other Internet Protocol (IP) facilities with IP connections to PSAPs. Each controller will need to be configured to be the failover if the other controller fails or partially fails. In the envisioned Statewide system, the Emergency Services Internet Protocol Network (ESInet) would exist only between the two hosts.

Initially each host controller will each be connected to the two existing CenturyLink selective routers via legacy gateways, but the proposed solution must have the ability to convert to NG9-1-1 core functionality without interruption of any existing legacy functions. The entire solution must provide 99.999 percent availability with exception to the last mile PSAP connection which will be required only when available. The solution must distribute the incoming services across multiple gateways and have the ability to accept calls from all classes of service.

The proposed solution must provide seamless ingress and egress to and from the legacy network. Initially the ingress and egress for 9-1-1 callers will be through the existing selective routers. The emergence of NG9-1-1 core functionality will eventually allow Voice over Internet Protocol (VoIP), wireless, as well as incumbent local exchange carriers (ILECs) and competitive local exchange carriers (CLECs) and future media providers to connect directly to the ESInet without the use of the existing selective routers.

As mentioned previously, the initial ingress to the host controllers will be from the existing selective routers via legacy gateways. At this point, egress from the host controller will be provided over an IP network to each remote PSAP. Care should be taken at this time to develop a network that will be robust enough or have the ability to expand from covering today's technologies, as well as the future applications for voice, video and data.

High Level requirements

Offerors must respond as either COMPLY, NOT COMPLY or EXCEPTION to the items detailed below. In addition, Offerors that are responding to this RFP are required to provide detailed responses immediately following each requirement.

If an Offeror takes EXCEPTION to a particular item, they must provide an alternative recommendation for how they intend to meet the requirement. If an Offeror's proposal does not fully meet any requirement, there must be a section labeled—exceptions to requirements." In this section, every requirement that the proposal does not fully meet must be revealed and a proposed solution must be offered.

Provision for an "exception to requirements" section is not to be construed as a willingness to accept proposals, which do not meet all requirements. It is recognized that a potential Offeror may be able to provide a solution that exceeds the functionality desired, in a manner that has not been considered by the State of South Dakota. It is strongly recommended that all submitted proposals meet all requirements identified in this RFP.

The State acknowledges that the desired South Dakota NG9-1-1 system may ultimately be provided by one or multiple providers. As such, respondents to this RFP may wish to offer one, many or all of the services, functions and systems described herein. It is understood that in the event of a successful single provider, that provider will be responsible for all services provided by their proposed subcontractors if so utilized. The State must ultimately ensure that a fully functional and operating NG9-1-1 system is deployed to replace the legacy system now in use within the State. Any needed function or methodology not specifically identified in this RFP shall be cause for the Offeror(s) to fail to deliver a functional/operational system. It is the State's intent to provide the basic information required in this RFP and the Offeror(s) responsibility to propose any single or all items needed to ensure delivery of a fully functional and operational system.

New network system features in the RFP are specified as requirements as they represent an essential feature to providing 9-1-1 services. Required features are represented by the use of the words must, shall, requirement or required.

Some features may be listed as desirable. These features are desirable but not required. They are represented by the words may, should, desired or desirable. Desirables will be considered when evaluating proposals, but only after requirements are addressed.

It is the intent of this RFP to lease an IP-enabled 9-1-1 call answering system, including hardware, software and automatic location identification (ALI) access components, to support all current VoIP, wireless and wireline 9-1-1 calls being answered in all 29 PSAPs, with the understanding that some or all of the four tribal PSAPs may not join the Statewide system now or ever. It must be scalable to support future NG9-1-1 IP features and requirements.

Requirements as listed in this RFP section are not all-inclusive but are meant to provide a granular index of network requirements for the IP network. Other sections provide requirements relating to project items that are not necessarily network technologically related.

This RFP provides the minimum requirements that the proposal will need to address when offering the automatic number identification (ANI)/ALI controller, workstation options for NG9-1-1 functionality and compatibility. It is not the intent of this RFP to provide details that would focus the Offeror's solutions toward one particular technology. The Offeror must provide their individual solution(s) and products configured in a manner that utilizes the latest NENA and Association of Public Safety Communications Officials (APCO) Next Generation E9-1-1 recommendations.

The following Scope of Work is provided in three parts, ESInet, 9-1-1 call answering system and system management.

3.1 Next Generation 9-1-1 Network Backbone

The requirements in this section are designed to ensure the suitability of the network for the purpose of transporting NG9-1-1 services and other Public Safety applications. The proposed ESInet infrastructure shall be an open-standards-based, private, secure, extensible and highly available IP network.

These requirements are drawn from the State's perspective, and therefore may not specify each and every element necessary for the Offeror to deliver the NG9-1-1 services as specified herein. As the

expert, the Offeror is expected to design, propose and implement the most effective and efficient solution at the most cost effective price. The solution must include but not limited to the following: Border control function (BCF), Policy routing function (PRF), Emergency services routing proxy (ESRP), Legacy network gateway (LNG), Emergency call routing function (ECRF) and Location Validation Function (LVF).

South Dakota may acquire the ECRF/LVF as a part of a separate Geographic Information Service (GIS) Services contract. If the award for such GIS Services includes ECRF/LVF features, then the Offeror who responds to this RFP will not be required to provide NG9-1-1 ECRF/LVF services. Instead, the Offeror must provide co-location for the ECRF/LVF services (*including rack space, power, cooling, etc.)* GIS vendor, the GIS vendor's ECRF/LVF solution, and ESInet IP connectivity to at least two POPs (as required by the GIS vendor) for the purpose of establishing ECRF/LVF connectivity. The Offeror will provide IP addresses and other information as required to interconnect the external ECRF/LVF to ESInet and/or NG9-1-1 services that are the subject of this RFP. Respondents shall include line-item pricing for collocation and for POP ESInet IP connectivity.

The NG9-1-1 Services Offeror shall provide a solution that exclusively utilizes the Internet Engineering Task Force (IETF) Location to Service Translation (LoST) protocol (RFC-5222) to interface the ECRF with the rest of the NG9-1-1 solution as provided by the Offeror, such that external RFC-5222-compliant ECRFs may be used in place of Respondent-supplied ECRF(s).

The Offeror should propose an optional ECRF/LVF with the specifications below.

3.2 Emergency Call Routing Function (ECRF)

The Offeror shall provide a clear description of the proposed ECRF, list its features and capabilities, discuss its error handling, default mechanisms and logging, and provide an overview of how it is deployed and achieves high reliability. The description must also discuss the GIS update process, frequency and how information will be exchanged with the States GIS services vendor including the handling of error reports.

3.2.1 The Offeror shall (optionally) provide the NG9-1-1 ECRF as defined in the NENA 08-003 Detailed Functional and Interface Standards for the NENA i3 Solution.

3.2.2 The ECRF is a critical function in the delivery of emergency calls via the NG9-1-1 Routing Service. The Offeror shall supply an ECRF function that is at least 99.999 percent available and reliable.

3.2.3 The Offeror shall be responsible for secure and reliable ECRF IP connections to at least two physically diverse points-of-presence (POPs) that are part of the South Dakota ESInet. The Offeror must comply with IP addressing and security requirements as established by the South Dakota ESInet.

3.2.4 The ECRF must interface and provide location-based emergency call routing functionality via the RFC 5222 (LoST protocol) and the functional specification of NENA 08-003.

3.2.5 The ECRF shall support LoST queries (via Transmission Control Protocol [TCP]) from ESRP(s), PSAP customer premise equipment (CPE), or any other permitted IP host within the South Dakota ESInet. The ECRF may rate-limit queries from sources other than provisioned ESRPs.

3.2.6 The ECRF shall log all connections, connection attempts, and LoST transactions.

3.2.7 All location information errors must be made available to the Providers for resolution and geocoding errors be written to a separate log or file, so that they may be easily handed off to the State GIS services vendor for investigation and correction.

3.2.8 The ECRF must be able to route locations based on geographical coordinates (LAT/LON) and based on civic addresses (house #, street, city, etc.).

3.2.9 The ECRF shall utilize the GIS database that supports the provisioning of all required map layers. The GIS data will include the road centerline and address range data, address structure points, PSAP boundaries, municipal boundaries, and police, fire and emergency medical services (EMS) boundaries. Such map layers shall represent the geographical boundaries (polygons) of some service type, such as emergency, police, fire, ambulance, etc. The ECRF shall permit the association of each LoST request type to one of these layers.

3.2.10 The ECRF shall comply with GIS standards including but not limited to NENA NG9-1-1 GIS Data Model, NENA 02-010, and NENA 02-014.

3.2.11 The ECRF shall support updates to the GIS database without disruption of ECRF LoST service.

3.2.12 The ECRF (or associated administrative program) shall be able to validate GIS database changes before they are applied, for example, detect overlaps or gaps in layer geographical boundaries.

3.2.13 The Offeror shall provide a Web portal that permits administrative read-only access to the GIS database. This function may be rate-limited to avoid impacting emergency call delivery services.

3.2.14 The Offeror shall state the maximum number of queries per second the proposed ECRF can sustain for at least one minute under adverse but “all up” conditions.

3.2.15 The Offeror shall describe and list the features of the proposed ECRF, with particular emphasis on how it meets the specific requirements herein.

3.3 Location Validation Function

The LVF is not a critical function involved in real-time emergency call delivery, but it must be available to Call Origination Providers and to the general public at large so these parties can verify that civic addresses or latitude/longitude will return PSAP or emergency responder Uniform Resource Identifiers (URIs). In many ways, the LVF is identical to the ECRF, but because the ECRF must be highly available, it is protected within the Core NG9-1-1 Routing Service security zone. The LVF is available to the general public via an LVF proxy in the public Internet in the Public Security Control Zone (PSCZ).

3.3.1 The Offeror shall (optionally) provide the NG9-1-1 LVF as defined in the NENA 08-003 Detailed Functional and Interface Standards for the NENA i3 Solution.

3.3.2 At least two LVF instances shall be deployed.

3.3.3 The LVF shall be a separate instance of the ECRF-like processes running within the Core NG9-1-1 Routing Service security zone.

3.3.4 The LVF process shall utilize a separate database instance of the GIS database derived from the ECRF GIS database. The Offeror shall show how this separate GIS database instance will be kept synchronized with the ECRF GIS database in real-time or near real-time.

3.3.5 The LVF shall be accessed via a proxy server located within the PSCZ. The Core NG9-1-1 Service firewall shall then allow LVF access only from the proxy process.

3.3.6 The LVF shall provide a standard LoST interface via a TCP port. This port may be listed in a Domain Name Server (DNS) entry. Connections and transactions on this port shall be logged and shall be rate limited by the PSCZ proxy.

3.3.7 The Offeror shall also provide a user-friendly Web server portal located within the PSCZ to which Internet users can browse and manually enter civic addresses or geographic locations along with a service request type. The Web server shall query the LVF via the proxy and return a user friendly display with the results of the LoST query. An actual map display with the location of the user location is highly desired. This function shall be highly rate limited, e.g., five queries/day/source IP address.

3.3.8 The LVF proxy may also provide a LoST interface accessible by a credentialed connection that may be used by call origination providers or other authorized parties. This port may be used to support a much higher rate of machine-to-machine LVF LoST protocol queries.

3.3.9 The Offeror shall explain the proposed LVF implementation, with particular attention to the arrangement of the proposed components, user interface and features and the security aspects of the LVF.

3.3.10 The Offeror must provide for a process for call origination providers to submit updates to GIS data or report discrepancies. The Offeror must then show how these submitted updates or reported discrepancies are then communicated to the GIS maintenance vendor for review and resolution.

Offerors are encouraged to provide information regarding improvements or alternatives to these requirements in their response. Unless otherwise agreed to in the RFP, the proposed IP network shall satisfy the characteristics and performance specifications as stated in this section.

3.1.1 General Requirements

3.1.1.1 Federal Communications Commission Rules

All equipment must conform to Federal Communications Commission **(**FCC) Rules Part 15, Class A (commercial, non-residential radiation and conduction limits) for electromagnetic interference (EMI).

3.1.1.2 Industry Standards

Where applicable, all equipment must comply with applicable industry standards, such as:

- Underwriters Laboratories (UL)
- International Organization of Standards (ISO)
- Open System Interconnection (OSI)

- Institute of Electrical and Electronics Engineers (IEEE)
- American National Standards Institute (ANSI)
- Electronic Industries Alliance (EIA)
- Telecommunications Industry Association (TIA), (including ANSI/EIA/TIA-568 Commercial Building Telecommunications Wiring Standards), etc.
- Equipment shall be compliant with NENA i3 standards.

3.1.1.3 Facilitating Carrier Transition

The Offeror shall be responsible for the migration of existing 9-1-1 services to the ESInet and to NG9-1-1 services at all interfaces between the Offeror and other emergency call originating network operators in order to accomplish 9-1-1 call delivery which meets the quality and reliability requirements of this RFP. This includes stating the terms, conditions, procedures, or processes for interconnection and exchange of information between other carrier's networks and systems and the Offeror's networks and systems. Unless the parties otherwise agree, such terms, conditions, procedures or processes shall follow applicable South Dakota Public Utilities Commission telephone industry practices, NENA standards and recommended practices, or applicable US telecommunication law. The terms, conditions, procedures or processes shall not impose onerous requirements on other network operators, and shall be stated in the proposed solution. Examples of such interfaces would be the means to perform the timely exchange of information such as legacy ALI database updates, exchange of monitoring/trouble ticket statuses, trunk connections to the LNG, and IP connections to border control functions. This list of examples is not exhaustive. The Offeror is expected to work closely with other network operators and to cooperate fully with them in order to accomplish successful transition to the NG9-1-1 call delivery system.

3.1.2 Emergency Services Internet Protocol Network Requirements

3.1.2.1 Open Standards Based

The proposed emergency services network shall be open standards based. The Offeror shall specifically identify if any portion of the solution is considered proprietary.

3.1.3 Quality of Service Features

The network shall have quality of service (QoS) features suitable for the real-time transport of VoIP traffic requesting emergency services.

3.1.4 Emergency Services Internet Protocol Network Suitability

The proposed ESInet shall be suitable for transporting emergency calls and associated data for all NG9-1-1 applications.

3.1.5 Emergency Services Internet Protocol Network Interconnections

The ESInet shall interconnect the host controllers between the two data centers. The hosted controllers shall interconnect all the End Sites listed in Appendix A. However, due to additional factors the State may face, they retain the option and discretion to choose deploying fewer End Sites. Such End Site eliminations, if any, will result in reallocation of the total emergency call traffic volume and total Core Network bandwidth among the remaining sites.

Such reallocation, if any, may require adjustments to the number of answering positions and access network bandwidth among the remaining sites. Because of these considerations, pricing must be itemized by each End Site.

3.1.6 GIS Data Provisioning

South Dakota anticipates contracting with a GIS vendor for GIS data and maintenance services and expects to continue this relationship for Next Generation (NG) GIS data support. A reference to GIS data in this RFP is describing this contracted support and specifically refers to availability of this data through the States GIS service vendor. The States GIS services vendor will be responsible for providing all GIS data used in the location routing, validation and mapping services under the direction of the South Dakota 9-1-1 Coordination Board that are part of the Offerors' system.

Geographic information system data management for the South Dakota NG9-1-1 system shall be controlled by the 9-1-1 Coordination Board through its contracted GIS data and maintenance vendor.

All data associated with call routing and plotting will be provided in a NENA NG standard format.

Originating call network operators will be expected to verify civic address location information against the NG9-1-1 GIS data using the LVF provisioned as required by this RFP.

The Offeror will be required to work with the States GIS data to insure all GIS data elements required by both the Offeror and South Dakota are provisioned in the system and to arrange appropriate automated procedures for exchanging GIS data, system performance data, and for resolving detected errors by either party.

3.1.6.1 Preferred Data Exchange Formats

The preferred data exchange shall be in Environmental System Research Institute's (ESRI) Structured Query Language (SQL) Spatial Database Engine (SDE) or geodatabase formats.

3.1.6.2 Data Updates

Emergency Call Routing Function data shall normally be updated on at least a daily basis. The Offeror shall work with the South Dakota 9-1-1 Coordination Board and the State GIS services vendor to develop a viable and mutually agreeable process.

3.1.6.3 Update Testing

The Offeror must be able to test, and then apply updates to the operating ECRF by a secure and reliable method that does not create operational problems. The Offerors GIS system shall be able to perform database audits for common problems and errors, such as gaps, overlaps or number range conflicts, which if encountered, shall be referred back to the State GIS services vendor for resolution,

3.1.7 Bandwidth Growth

The proposed ESInet shall be able to accommodate growth of bandwidth, interconnection to additional sites in South Dakota and interconnection to other national and/or state-level ESInets in the future.

The proposed ESInet shall support such future growth and interconnections with minimum impact on the proposed infrastructure through incremental additions to the existing network.

3.1.8 Real Time Monitoring

The proposed IP network shall be monitored in real time for the satisfactory operation and security of all significant components and required performance parameters.

The State or its designated representative shall be able to ascertain the status of major IP network elements by viewing a status map or display with a Web browser which is connected to the ESInet, or via a similar tool or mechanism.

3.1.9 ESInet Architecture Overview

The State does not prescribe how the Offeror shall implement the IP network. The State's view of the ESInet is at OSI Layer-3, that is, the delivery of IP packets between nodes on the network. From the State's perspective, and in the absence of specific security policies as specified by State, the network shall deliver IP packets from any IP address to any other IP address among any and all connected sites.

Offerors may select any Layer-1 (copper, fiber, wireless, etc.) and any Layer-2 (High-Level Data Link Control [HDLC], frame-relay, Asynchronous Transfer Mode [ATM], Multiprotocol Label Switching [MPLS], etc.) technologies, in any combination and arrangement, which will deliver the most cost effective solution that meets the requirements of the RFP.

3.1.10 Provision of Layer-1/Layer-2 Facilities

Offerors shall provide, directly or through subcontractors, the Layer-1/Layer-2 facilities, as may be required, to interconnect to the specified sites.

3.1.10.1 Layers 1 and 2

Offerors shall disclose the Layer-1 and Layer-2 technologies and topologies that they intend to deploy by providing network diagram(s) and text that show and explain these implementation details. Diagrams should be high level, not complete network diagrams showing all network sites and should be in hard copy as well as electronic format.

3.1.10.2 Network Diagram Clarity

Network Diagrams shall display enough information about the core network and about each unique type of site connection so that the topology and design and the selection of the Layer-1, 2, and 3 technologies are clear.

3.1.10.3 Network Diagram and Narrative Information

Network diagrams and narrative shall provide sufficient information so technical reviewers can identify how the design meets the requirements and intent of this RFP. The drawings, narrative or tables shall convey all points-of-interconnection (POIs) and/or hub locations.

3.1.11 Layer-3

In normal (all up) operation of the ESInet, the Layer 3 IP service shall meet the service level requirements specified in Appendix B of the Agreement.

3.1.11.1 No Single Point of Failure

Except for PSAP sites listed in Appendix A as non-redundant (sites with seven or fewer seats), the failure of any single component shall not interrupt the network to deliver IP traffic between interconnection points, to deliver IP traffic to redundant sites or to maintain the operation of network services such as network monitoring services.

3.1.11.2 Open Standards

The proposed network shall be based on open standards, such as IEEE 802 at ISO Layer-2, and IP and TCP, as defined by the Internet Engineering Task Force (IETF) in the applicable RFCs, at ISO Layer-3 and above.

3.1.12 Blocking or Inhibition of Protocols

All standard protocols that use IP for transmission shall be transported over the proposed network. No specific protocol or use of the IP network may be blocked or inhibited by the ESInet provider, except to comply with State-specified security policies.

3.1.13 Proprietary Standards

Offerors shall reveal any use of proprietary standards or protocols in their proposed solution or state that they fully comply with the open standards requirement. Any limitations, whether technological or policy related, shall be revealed.

3.1.14 Scalability – Expansion Requirements

The overall design shall scale with respect to bandwidth, additional sites and interconnection with other ESInets. The design shall permit a doubling of bandwidth, the doubling of the number of connected sites, and/or interconnections to as many as five additional 9-1-1 call delivery ESInets such as ESInets in adjacent states.

The design shall accommodate this level of expansion without wholesale replacement of network components, fork lift upgrades or excessive non-incremental costs. For example, if doubling the bandwidth requires replacement of all Core Network routers, then this requirement has been violated. However, if the addition of a site requires installation of additional interface cards and site-specific routers, or even the addition of a core router that can be shared among several additional sites, then this will be considered normal incremental cost, and this requirement will still be satisfied.

3.1.15 Diagrams and Narratives

Offerors shall demonstrate, through the diagrams, narrative and pricing, how this goal can be realized within the proposed network design. This narrative shall explain changes or upgrades to proposed components of the network that would be required to accomplish this level of expansion.

3.1.15.1 Architectural Survivability

The Core Network and the redundantly connected sites shall be able to survive the total destruction, such as by fire or flood, of any one Core Network site, such as a switching center, data center or POI site.

3.1.15.2 Network Diversity

The proposed network shall incorporate service provider and/or facility/media diversity wherever it is economically reasonable to do so. The Offeror shall identify cost estimates for complete diversity.

3.1.15.3 Diversity Requirements

Where economically available, the network core solution and redundantly connected sites shall include physically diverse routes and physically diverse building entrances. The Offeror shall identify cost estimates for complete diversity.

3.1.15.4 Non-Diverse Network Elements

Any network elements that are not provisioned with physical diversity shall be disclosed and explained in the proposal.

3.1.16 Network Availability

Assuming full redundancy has been implemented at all sites and ignoring possible diversity limitations, the proposed Core Network shall be designed to provide 99.999 percent availability to all sites as measured monthly. Offerors may be required to defend their claim of a 99.999 percent design by producing statistics on mean-time-between-failures and other data on critical network elements together with a risk analysis.

3.1.17 Redundancy Threshold

The Offeror shall price the solution on a per workstation basis, and PSAPs below the threshold of seven workstations shall not require full network redundancy.

3.1.18 Service Level Agreements

The service level agreements (SLAs) shall specify the performance requirements for the network as actually deployed at any time. Offerors shall disclose risks to achieving high availability (99.999 percent) in their proposed solution.

3.1.19 Quality of Service

There are QoS performance requirements related to the network that must be maintained. The following network performance requirements are taken directly from NENA 08-506, Version 1, December 14, 2011:

- **Packet Loss**
  An overall (end-to-end) packet loss budget for maintaining intelligible voice transmission is about 5 Percent. Out of that 5 percent budget approximately one half of the packet loss should be allocated for the ESInets with the remaining allocated for the origination network. It is a best practice to engineer ESInets to keep the packet loss budget under 2.5 percent. ESInets should be designed without oversubscription. Packet loss of less than 1 percent should be achievable on such ESInets.

- **Jitter**
  It is a best practice to design ESInets to maintain less than 20mS variation in the end point jitter buffers.

- **Latency**
  The one-way transit delay (e.g. end-to-end, mouth to ear) for real-time media packets should not exceed 150mS. (ITU-TG.114). The maximum acceptable delay for packets traversing the ESInet should be less than or equal to 35 mS. It is a best practice to design ESInets to operate with less than 15 to 20 mS of latency. This allows the original encode and decode and a conference bridge in the middle of the path and still achieve the maximum 35mS or less packet delay.

3.1.20 Network Upgrades and Maintenance

The proposed Core Network and redundantly connected End Sites shall not be adversely impacted by down time for planned maintenance. It is acceptable that individual components or elements have down time for planned maintenance.

3.1.20.1 Down Time Disclosures

Offerors shall, five business days in advance, disclose any service impact, limitation or operational issue that may arise as a consequence of planned or immediately prior to unplanned down time of any such individual component.

3.1.20.2 Planned Maintenance

Planned maintenance shall be performed in accordance with an appropriate standard operating procedure (SOP) designed to mitigate the operational impact of such maintenance. Scheduled downtime must be coordinated with the State with at least five business days advance notice prior to performing the scheduled downtime in order for the downtime not to be calculated into the monthly network availability factor.

3.1.20.3 SOP Availability

Standard operating procedures shall be made available to the State upon request.

3.1.21 Bandwidth

The Offeror shall state their bandwidth requirement for the NG9-1-1 call delivery system for one PSAP workstation, assuming a voice call in progress meeting the quality requirements of this RFP. If this value exceeds 300 Kilobits/second, the Offeror must justify the requirement by providing the rationale and/or basis for the bandwidth calculation.

The bandwidth requirements are for a fully functioning network with all redundant connections in service. The failure of a redundant link may result in a loss of up to 50 percent of the specified minimum bandwidth to the effected site(s). This loss of bandwidth is allowable in the event of a failure or a scheduled maintenance activity.

3.1.21.1 Calculation of Bandwidth

The Offeror shall calculate the minimum bandwidth required between the Core Network and any End Site (the Access Network) by multiplying by the total number of workstations at that site by the requirement per workstations as stated above, and then add at least 50 percent to that sum.

3.1.21.2 Minimum Bandwidth

If the expected bandwidth is calculated to be less than 1.5 Megabit/second, then the minimum bandwidth to the site shall be 1.5 Megabit/second.

3.1.21.3 Bandwidth Expansion

The proposed solution shall support a growth in bandwidth at each site to at least double the initial requirements by adding facilities or using faster facilities, but without replacing major components such as core or on-site routers.

3.1.22 Network Facilities

Access Network facilities that connect an End Site, such as a PSAP site, to the Core Network, meet the Core Network at a POI (A POI could be another PSAP site). The Core Network (POI-to-POI connections) shall be able to sustain IP traffic without limitations assuming all End Site interconnections, as discussed in the previous section, are operating at full bandwidth capabilities.

3.1.22.1 Access Network - End Site Interface

At each redundant End Site, the Access Network to End Site demarcation interface to the site's local area networks (LANs) shall be two redundant 100-Megabit or faster unshielded twisted pair (UTP) Ethernet ports. The NG9-1-1 services component of this RFP may require the Offeror to provision LAN(s) at the site. Such LANs are not considered to be part of the Core Network or Access Network, but are a component of the complete ESInet infrastructure.

3.1.22.2 No-Single-Point-Of-Failure Requirement Compliance

In order to comply with the no single-point-of-failure requirement, the two demarcation Ethernet ports shall not be provisioned on the same piece of hardware, such as a single Ethernet switch or router. Non-redundant sites may utilize a single 100-Megabit or faster UTP Ethernet port.

3.1.22.3 Ethernet Failover

For redundant sites, the Offeror shall list and describe the Ethernet port fail-over scheme. The fail-over scheme shall be one that is widely used in the industry and that complies with open standards.

3.1.23 Internet Protocol Addressing

The proposed IP network infrastructure shall support and route both an IP version 4 (IPv4) address space and an IP version 6 (IPv6) address space as two "virtual" but independent networks. Alternatively, the IPv4 network may be encapsulated in the IPv6 Core and Access networks, with encapsulation occurring at the Access Network side of the End Site demarcation interface. The use of encapsulation does not relieve the Offeror from being able to monitor the operation of the IPv4 network as required in the RFP.

At the State's request and discretion, the Offeror may be requested to provision an additional (third) IP address space, as a logically separate IP network, for example as a virtual private network (VPN) or encapsulated network. The purpose of this third logical IP network would be to securely separate other public safety applications and interconnections from the NG9-1-1 call delivery application.

3.1.23.1 Internet Protocol Version 6 Address Space

The Offeror shall obtain/provide an IPv6/48 allocation for the ESInet.

3.1.23.2 Emergency Services Internet Protocol Network Allocation

The IPv6 allocation shall be announced by at least two routers in the Core Network.

3.1.23.3 Internet Protocol Version 6/64 Block Assignment
The Offeror shall assign one IPv6 /64 block to each site as a subnet of the /48 announcement.

3.1.23.4 Subnet Number Assignments
The subnet number for each site assigned prior to deployment shall be reported to the State.

3.1.23.5 Core Network Provisioning
The Core Network, including links to routers located at the sites, shall be provisioned with IPv6 addresses from the announced /48 block.

3.1.23.6 Network Static Addressing
The proposed network shall be statically addressed at all major network interfaces, such as router interfaces.

3.1.23.7 "Loopback" Interface
A "loopback" interface with a static IPv6 address shall be assigned to each network element that is capable of IP administration, such as a router, switch or server.

3.1.23.8 Conducting Network Monitoring
To the maximum extent possible, network monitoring and administrative functions shall be conducted via the IPv6 network. Offerors shall highlight their IPv6 capabilities.

3.1.23.9 Internet Protocol Version 4 Address Space
Offerors shall assign private IPv4 addresses from the 10.23.0.0/16 address space.

3.1.23.10 10.23.x.x /23 block
Each site shall be assigned a 10.23.x.x /23 block.

3.1.23.11 Subnet Number Assignments
The subnet number for each site shall be reported to the State.

3.1.23.12 Internet Protocol Version 4 Connectivity
IPv4 connectivity shall be established between each site, either by native IP routing or by tunneling through the IPv6 network, at the Offeror's option.

3.1.23.13 Internet Protocol Version 4 Specific Functions
Offerors shall list network functions, such as monitoring or administrative functions, that they can only perform using IPv4. The successful Offeror may be required to work with entities that presently implement only IPv4 addresses to assign a suitable IPv4 address to their Ethernet demarcation connection and to tunnel or route IPv4 addresses outside the 10.23.0.0 block through the network to other sites, as needed.

3.1.23.14 Entity Cooperation
While the Offeror shall not be required to make changes in entity IP networks that are outside the scope of this RFP, the Offeror shall be required to fully cooperate with those entities. For example, the Offeror shall provide information, perform configuration changes in edge network routers, to change entries in core domain name system (DNS) services, and, in general, assist entities in utilizing the ESInet to the fullest extent possible while in compliance with State policy.

3.1.24 Internet Protocol Routing

The IP network shall implement a dynamic IP routing protocol. The State requests Open Shortest Path First (OSPF) as defined in IETF RFCs and as commonly implemented in the industry. However, Offerors may present other solutions for consideration, provided the solution is open standards-based and is supported on Linux, Microsoft and Unix hosts.

3.1.24.1 Internet Protocol Packet Delivery

The IP routing protocol shall provide for the delivery of IP packets from any IP address to any other IP address within an address space in the ESInet, or to any connected IP network, or to reachable IP networks via a connected IP network.

3.1.24.2 IP Routing Problem Resolution

The selected Offeror shall work with the operators of interconnected IP networks to resolve IP routing problems as a feature of the supplied service.

3.1.24.3 Automatic Internet Protocol Rerouting

The IP routing protocol shall be set up to provide automatic IP rerouting in the event of a failure of any network facility or component, even if automatic rerouting is provided at another OSI Layer, such as Layer 2.

3.1.24.4 Network Stability

The dynamic routing protocol shall be configured (tuned) to mitigate IP route instability in the network.

3.1.24.5 Loss of Bandwidth

The dynamic routing protocol shall be configured to prevent serious loss of bandwidth due to routing table updates or other deleterious behavior in the presence of a flapping device or other such intermittent problem, while still providing automatic rerouting as quickly as is reasonably possible.

3.1.24.6 Internet Protocol Routing Protocol Implementation Narrative

The Offeror shall provide a short narrative describing the IP routing protocol implementation. This narrative shall describe how the network responds to various failure scenarios and how route instability in the network is avoided.

3.1.25 Quality of Service

The proposed network shall implement a QoS function that can assure timely delivery of Real-time Transport Protocol (RTP) packets even in the presence of network congestion from other non-real-time protocols, up to the limit of the available bandwidth. A differentiated services (DiffServ) QoS scheme is requested.

3.1.25.1 Non-Real Time Traffic Prioritization

The QoS system shall also be able to prioritize other non-real time traffic, such as Session Initiation Protocol (SIP), if needed.

3.1.25.2 Real-time Transport Protocol Streams

Quality of Service support for RTP streams shall be configured into the network. The design shall minimize excessive latency and jitter.

3.1.25.3 Bandwidth Sharing

The proposed QoS or IP routing scheme shall ensure that a specific RTP session does not "share" bandwidth on redundant links. This requirement is to ensure that RTP packets in user datagram protocol (UDP) streams do not arrive at the destination out-of-sequence should the redundant links have considerably different latencies.

3.1.25.4 Traffic Prioritization Narrative

Offerors shall provide a brief narrative overview of how they prioritize traffic across the network. Any interaction between the QoS implementation, IP routing or other protocols shall be revealed and explained.

3.1.26 Network Address Translation

The use of Network Address Translation (NAT) within the proposed IP network is highly discouraged and is prohibited within both the IPv6 and the IPv4 10.23.0.0 address spaces. Network Address Translation presents special problems for the reliable implementation of SIP and RTP streams that traverse the NAT device. Offerors that use NAT shall demonstrate their understanding of the SIP/RTP/NAT problem and explain how they intend to mitigate any issues that might arise.

3.1.27 Back-to-Back User Agent Usage

Network Address Translation capability at points of interconnection with other IPv4 networks/address spaces may be required in order to resolve possible IPv4 addressing issues. However, if SIP or RTP traffic needs to cross such boundaries, it shall be handled with back-to-back user agent (B2BUA) type of session border controllers (SBCs), rather than via NAT. Back-to-Back User Agents shall also be used to transport SIP and RTP between IPv6 and IPv4 networks, if required. If required by the application, the SBC shall be able to forward SIP location conveyance data between the User Agents (UAs).

3.1.28 Network Monitoring

The ESInet transport infrastructure shall be monitored on a 24x7x365 basis.

3.1.28.1 Simple Network Management Protocol Version3 Support

All IP manageable network hardware shall support the Simple Network Management Protocol version 3 (SNMPv3) specification for performance monitoring via standard management information base (MIB) objects.

3.1.28.2 Network Fault Monitoring

Fault monitoring shall detect and log IP network problems, notify the network operator, and depending on severity and policy, provide timely notification of designated PSAP official and State staff. Examples of such network problems include failed circuits, equipment or network functions. If the failure is transitory or immediately corrected, notification is not required, but all events shall be logged and included on required reports. All system alarms are required to be monitored in the call-taking/dispatch area of the PSAP. An externally-mounted alert system is required to indicate a failure. All audible alarms will be able to be silenced until the event is cleared.

3.1.28.3 Network Performance Monitoring

Performance monitoring shall measure the variables that affect network performance.

3.1.28.4 Information Retrieval

Offerors shall describe how their monitoring solution stores information for reporting and subsequent retrieval purposes, including any requirements for accessing such features by the State.

3.1.28.5 Network Operations Center

The Offeror shall utilize a Network Operations Center (NOC) which is staffed to support 24x7 restoral or mitigation of incidents.

3.1.28.6 Trouble Ticket System

The Offeror shall have a 24x7x365 trouble ticket system. The Offeror shall describe the system's capabilities and procedures involved in generating, resolving and reporting on trouble tickets for all (network, PSAP, training, reports, etc.) problems. In addition to supplying a 24x7 toll free number, the Offeror shall also describe other methods of generating (email, text msg., etc.) and acknowledging trouble tickets.

3.1.29 Managed Network Services

The Offeror shall supply and describe their Managed Network Services (MNS) system, including, but not limited to:

- Operating system updates
- Anti-virus software
- Security software
- Applications software
- Disaster recovery
- MNS services that are out-sourced
- State access to view system status

3.1.29.1 Offeror Contact Number

The Offeror shall provide a 24x7x365 toll free number accessible to authorized personnel, as determined and authorized by the State.

The use of the network monitoring system does not preclude the State from installing and using its own monitoring system for remotely monitoring PSAP equipment, using the IP network for remote environmental monitoring of connected sites, or for other such applications.

3.1.29.2 Network Configuration and Change Management

Offerors shall concisely describe the process and/or SOP that they use for making changes to the network and/or its configuration. Changes may include adding a connection, re-provisioning a circuit, or changing a QoS priority.

The description shall describe procedures such as how proposed changes are planned, authorized, authored, reviewed, noticed, implemented, tested, backed out, and backed up. The description shall also identify the personnel involved. The Offeror's role and any State requirements in this process are especially important.

3.1.29.2.1 Configuration Back Up

Offerors shall describe their capability to automatically or routinely backup network configuration data, such as router and switch configurations.

3.1.29.2.2 Configuration Restoration
The process and conditions used to restore the configuration of network elements such as routers or switches, should the need arise, shall be described.

3.1.29.3 Root Cause Analysis
In the event of a critical or major outage, the Offeror shall provide State staff with a root cause analysis within five business days. A Root Cause Analysis (RCA) shall be provided upon request for minor outages (as described in Appendix B of the Agreement)

3.1.29.4 Trouble Shooting Tools and Techniques
Offerors shall describe the tools and techniques at their disposal to perform troubleshooting and post-event analysis.

3.1.29.5 Scheduled Maintenance
The Offeror shall provide a schedule of preventive maintenance activities, their frequency and strategy to continue network functionality during maintenance activities.

3.1.29.6 Maintenance Standard Operating Procedure
Any maintenance by Offerors, including upgrades to the network, shall be conducted in accordance with a mutually determined SOP.

3.1.29.7 Remote Location/Back-Up
The Offeror shall assure that a remote location and its designated back up are not affected at the same time.

3.1.29.8 Support Logs
The Offeror shall use support logs to drive the development of solutions to recurring issues.

3.1.30 Security Monitoring and Management
Security monitoring and management shall be quoted separately from other monitoring and management services.

3.1.30.1 Standards
Offerors shall have general knowledge of IP network security systems, and the standards found in these documents:

- NENA NG-SEC Document 75-001
- NENA i3 Technical Requirements Document 08-751
- NENA Detailed Functional and Interface Standards for NENA (i3) Solution Stage 3 08-003

Security in the ESInet shall be in accordance with the requirements below and any security policy as approved by the State. The State may modify the security policy at any time at its sole discretion.

3.1.30.2 Access Control
The Offeror's security management solution shall control access to network resources according to public safety network security guidelines to prevent sabotage and the compromise (intentional or unintentional) of sensitive information.

3.1.30.3 User Monitoring

Security management shall use Public Safety network security standards to monitor users logging into the network resources and refuse access to those who enter inappropriate access codes.

3.1.30.4 Security Techniques and Protocols
The proposed network shall support standard security practices that may include the use of anti-virus software, virtual local area networks (VLANs), VPNs and secure sockets layer protocols.

3.1.30.5 Logically Separated Next Generation 9-1-1 Local Area Networks
Any LAN(s) supplied and installed at a PSAP or other edge site to provide NG9-1-1 call delivery services or interconnect equipment, as required as part of this RFP, is intended to be a limited access and secure LAN(s). Such LANs shall not be interconnected with any other LAN(s) at the PSAP/edge site, and shall run in the NG9-1-1 call delivery system address space.

3.1.30.6 Physical Port Protection
Any empty, spare or otherwise unused Ethernet ports on equipment (such as routers and switches) supplied as part of this RFP shall be administratively disabled at the time of ESInet and NG9-1-1 service is commissioned.

3.1.30.7 Protection Against User-Loaded Software
Any workstations or computer equipment supplied as part of this RFP, if equipped with Universal Serial Bus (USB) ports and/or removable media storage devices, shall have such USB ports and/or removable media storage devices physically or administratively disabled or otherwise restricted, such that jump drives or removable media cannot be readily used by casual users to upload executable software into the workstation or equipment without access to administrative accounts, or modification of the equipment.

3.1.30.8 Interconnection of Other Networks
Until the South Dakota NG911 system is fully deployed to all local PSAPs and any tribal PSAPs that elect to participate, the ESInet will only be used for the end purpose of accepting 9-1-1 “calls” from the public and delivering those calls to the PSAPs however, the ESInet must be scalable and able to interconnect with other edge site LANs, such as computer aided dispatch (CAD) systems or other Public Safety applications as may be approved by the State 9-1-1 Coordination Board at any point during or after the initial project.

3.1.30.9 Other Network Qualification
Any IP network authorized by the State 9-1-1 Coordination Board to connect to the ESInet shall be required to comply with standards, including the security standards, and demonstrate compliance through an initial and recurring audit.

3.1.30.10 Anti-virus Software
Offerors shall provision one anti-virus firewall or gateway at each edge site to support safe and secure interconnection of non-NG9-1-1 LANs across the state.

3.1.30.11 Anti-virus Database
The anti-virus firewall shall use an antivirus database to scan incoming and outgoing packets for the presences of malicious software, and block and log such activities. The Offeror shall describe how they will maintain the anti-virus database.

3.1.30.12 Security Logging

Security events, including failed logins, antivirus updates, antivirus detection and other security events must be logged. The Offeror shall describe how they will monitor and log the ESInet for security violations, and what activities will be logged.

3.1.31 Transient Voltage Surge Suppression

In addition to primary protection, secondary Transient Voltage Surge Suppression (TVSS) shall be installed.

3.1.31.1 Copper Pairs

All copper pairs entering the building shall be provided with secondary TVSS protection.

3.1.31.2 Transient Voltage Surge Suppression Device Protection

Transient Voltage Surge Suppression devices shall protect all incoming and outgoing equipped ports that are or could be connected to wireline or wireless facilities. These facilities include central office (CO) plain old telephone service (POTS), 9-1-1 trunks, T1/DS1 facilities or State owned CPE and facilities.

3.1.31.3 Installation Kit

The Offeror shall include an installation kit including all ground bars and ground wiring for installation at each site for the Offeror's equipment. Offerors may assume a suitable ground exists. If it does not exist, a suitable acceptable ground shall be provided by the jurisdiction.

3.1.31.4 Clamping Voltage

The secondary TVSS devices shall list a clamping voltage of 250 volts (.5kV) or less and operate in less than 10 nanoseconds.

3.1.31.5 UL497A Requirements

The device shall meet UL497A requirements and shall have an operational indicator to alert maintenance personnel that the device has been utilized, failed or that the circuit is unprotected.

3.1.31.6 Audio Signaling Degradation

The secondary TVSS shall not degrade the audio signaling.

3.1.31.7 Manufacturer's Warranty

The secondary TVSS shall have a minimum of a one year manufacturer's warranty.

3.1.32 Spares

Offerors shall describe their spares program including stocking levels and locations and the time required for an on-site field technician to access a spare. The role of State, if any, in spare stocking or access shall be explained.

3.1.33 Current and New Equipment

Only new equipment shall be considered. Refurbished or used equipment shall not be considered as part of the proposed solution.

Offerors may submit an additional response for using existing PSAPs equipment that has been installed within the past six months.

3.1.33.1 Hardware Age and Support

The State requires that proposed hardware be of current manufacture and fully supported.

3.1.33.2 End of Maintenance/Support Equipment

Equipment that has been announced as end-of-sale within one year of installation is not acceptable.

3.1.33.3 Use of End of Sale Equipment

If a proposed device or software goes into end-of-maintenance/support status within the contract period, its equivalent or better current manufacture shall be installed at the Offeror's expense unless agreed otherwise.

3.1.34 Inactive Connections

As not to incur costs for inactive network connectivity, the successful Offeror is expected to collaborate with the State to develop a plan to utilize network connections in a phased approach as PSAPs are migrated to the Statewide ESInet.

3.2 Host/Remote Call Answering System

3.2.1 General Technical Requirements

The solution shall be IP based and shall comply with all current NENA i3 standards. By definition IP-based means that the design of the solution is such that primary processing of voice communications is accomplished within an IP architecture. Hybrid Time-Division Multiplexing (TDM) systems that have IP capability are not acceptable.

The solution shall have a minimum of two physical servers each that process the packets for voice and data. Features of the server operation shall provide the minimum functionality as follows:

- In the event of a failure of the active server, switchover to the second server shall be automatic and shall result in no loss of service.
- The system shall have a non-blocking, fault-tolerant switching fabric which expands as interface cards are added.
- Every interface port shall have dedicated resources to detect tones, generate tones and support audio conferencing.
- Power to each system shall be delivered to the equipment such that the failure of a single power supply will still allow the redundant systems to function without loss of ability to process calls. The power supplies shall be connected to an uninterruptible power supply (UPS) capable of supplying power for 20 minutes. The UPS shall be compatible with emergency generators for automatic power loss handling.

Next Generation-9-1-1 routing service equipment will be located in geodiverse locations and may include data centers. The Offeror shall locate at least two Tier IV data centers which comply with TIA 942, "Telecommunications Infrastructure Standard for Data Centers", Revision 5 (2010)[1]

- Shall meet or exceed all Tier 1, Tier 2 and Tier 3 requirements.

[1] http://en.wikipedia.org/wiki/Data_center

- Ensure all cooling equipment is independently dual-powered, including chillers and heating, ventilating and air-conditioning (HVAC) systems.
- Have fault-tolerant site infrastructure with electrical power storage and distribution facilities with expected availability of 99.995 percent.

3.2.2 Hosted Solution Capability

The solution shall be capable of hosting multiple remote PSAPs in multiple jurisdictions. Each PSAP will be composed of a number of remote positions plus security appliances necessary to prevent intrusion by unauthorized personnel. Each individual PSAP will require an IP transport network between the remote PSAPs and the system.

There shall be no signal conversion between the host and remote PSAPs, the connection shall be IP end-to-end. It shall be configurable to send real-time call detail record (CDR) to a printer at any PSAP for any 9-1-1 call that is being handled by that PSAP. Administrative lines shall be capable of terminating at the host or at the remote PSAPs. The IP transport network will be used to backhaul admin line traffic to the host.

The Offeror shall submit a system diagram of their solution, depicting data flow and interconnection requirements.

3.2.3 Security

The solution shall allow for varying levels of administration and security for: all reconfiguration, monitoring, diagnostic and maintenance activities. Although the different jurisdictions are sharing a common hosted platform, from a PSAP perspective it shall appear to be a dedicated system. Individual PSAPs/jurisdictions shall not have visibility into the activities of other PSAPs/jurisdictions.

Offeror shall describe how the solution ensures the security and data integrity of individual PSAPs/jurisdictions.

3.2.4 Solution Sizing

The solution shall be sized to support the PSAPs as listed in Appendix A and allow for reasonable expansion.

The Offeror shall list the network connections and bandwidth requirements to support the proposed solutions.

3.2.5 Documentation

3.2.5.1 As-built

Two complete sets of as-built drawings will be required by the successful Offeror of this RFP. As-built drawings shall be submitted in Microsoft Visio™ format, or other agreed upon graphic format as delineated in the contract, on two individual sets of CD's. Future installation and acceptance of the solution shall not be complete until as-built drawings are delivered.

3.2.5.2 Manuals

The successful Offeror shall provide documentation for installation, operating and maintenance for each component of the solution. This documentation will include user manuals, maintenance manuals, configuration manuals, parts list of the equipment necessary for the continued and proper preventative maintenance and repair. Manuals will be in both printed and electronic form (DVD or similar media). Six sets of manuals will be in printed form.

3.2.6 Controller Systems

3.2.6.1 Controller - Call Recovery

The switch shall be specifically designed for 9-1-1 and shall not permit calls to be "hung" or lost.

3.2.6.2 Controller - Switching Technology

The switch shall utilize i3 compliant switching technology.

3.2.6.3 Controller - Audio Signal Processing

Any Coder Decoder (CODEC) audio signal protocol entering the central CPE equipment from direct VoIP Internet Service Providers (ISPs) shall be supported utilizing VoIP CODEC techniques. The system shall attempt to negotiate the use of G.711 to maximize call fidelity.

3.2.6.4 Controller - Interface, Control Functions, Standard

The new solution architecture shall consist of a complete ANI/ALI controller system with interface modules to external circuits. The ANI/ALI control functions shall combine into a fully redundant solution. The architecture shall conform to NENA i3 standards, as well as requirements outlined in this document. The Offeror shall configure the PSAPs as fully survivable solution offering a fault tolerant and secure architecture.

3.2.6.5 Solution Availability

It is a requirement that the solution deliver an industry standard up time of 99.999 percent.

The Offeror shall describe any predictable maintenance or upgrade process affecting hardware, firmware or software that would require the proposed solution be removed from service for any length of time.

The Offeror shall describe the method for uninterrupted service in the event of the unavailability of a PSAP system.

3.2.6.6 Next Generation Functionality

The solution shall not require a fork lift upgrade to deliver NG9-1-1 functionality at any point along the migration path to true NG9-1-1 ("Network-of-Networks" as envisioned by the United States Department of Transportation [USDOT], NENA and others). The State fully intends to participate as part of a national ESInet in the future and requires that the solution be compliant with consensus standards of industry associations, regulatory bodies, carriers and vendors.

The Offeror shall describe how the solution will comply with standards as they emerge for such core NG9-1-1 functions as:

- ECRF
- LVF
- Implementation of a Statewide GIS database
- ESRP
- BCF

Immediate compliance with all new standards as soon as they are released is not expected but the Offeror shall describe how the lag time between ratification of a new standard and compliance will be minimized.

3.2.6.7 Multi-media Requests for Assistance

As part of the evolution of 9-1-1, new call types are inevitable. These new call types include instant messaging, cellular phone texting, multi-media messaging, video messaging and non-human initiated calls (e.g. alarms and vehicle emergency devices). The State intends to be able to handle NENA i3 compliant calls in the future, potentially before national standards are fully adopted.

The Offeror shall describe how their solution supports multi-media calls now or how it will in the future. Please describe any industry testing for such calls you have participated in and describe any prototypes or production models that have been developed to support multi-media calls.

3.2.6.8 Geographically Diverse Redundant Configuration

The solution shall support installation in a geo-diverse redundant configuration. The geo-diverse redundant solution shall be composed of standalone controllers. Additionally, each individual controller shall be fully redundant and fault tolerant.

The Offeror is responsible for assessing and determining the optimal locations and providing connectivity options, such as, Sonet Ring and MPLS. The central equipment at each location shall be fully capable of supporting 50 percent of all the workstations. Each location shall have local survivability such that if one location becomes completely unavailable due to a catastrophic natural or man-made event, the other locations can continue to process all 9-1-1 calls without intervention from the other unavailable controller.

The Offeror shall describe the call flow in the event one or more controllers suffer a catastrophic failure.

The Offeror shall describe the network bandwidth and latency requirements necessary to support the geo-diverse redundant configuration.

3.2.6.9 Future-proofed Architecture

The solution shall be designed to future-proof the State against the requirement for a "forklift" upgrade of CPE equipment at any time during the transition to NG9-1-1. It is a requirement to maintain the same level or improve on the reliability and service characteristics inherent in existing E9-1-1 system.
Criteria to meet the requirements:

- Reliability/dependability as governed by NENA's technical standards and other generally accepted base characteristics of E9-1-1 service
- Service parity for all potential 9-1-1 callers
- Least complicated system design that results in fewest components to achieve needs (simplicity, maintainable)
- Maximum probabilities for call and data delivery with least cost approach.
- Documented procedures, practices, and processes to ensure adequate implementation and ongoing maintenance for 9-1-1 systems

3.2.6.10 Interoperability

The Offeror shall describe the programs it is participating in to test their system with products from other vendors.

3.2.6.11 Open Source Reliance
The Offeror shall describe if its proposed solution utilizes open source software/products and detail what if any are utilized. Describe how product enhancement control is maintained independent of open source community advances.

3.2.6.12 Remote Positions
The solution shall support the deployment of remote workstations at the locations listed in Appendix A. The remote workstations will require an IP transport network between the controller network and the remote workstations. There shall be no signal conversion between the controller and the remote workstations, the connection shall be IP end-to-end. The remote workstations shall have the same functionality and access to resources as the current local legacy positions.

3.2.6.12.1 Optimal Network Connectivity
The Offeror shall provide a recommendation for optimal network connectivity, bandwidth and latency requirement per workstation.

The Offeror shall describe any additional data or networking equipment required at the remote workstation location or at the primary location to support this function.

3.2.6.12.2 Remote Public Safety Answering Point Operator
It is the State's desire to have a feature that allows trunks to be accessed based on user profiles. If a PSAP's 9-1-1 trunks are connected to a host, any other PSAP also connected to that host would have those trunks available to them if they use the right profile.

The Offeror shall describe how the system supports the implementation of a virtual PSAP.

3.2.6.13 Automatic Call Distribution
The solution shall be equipped with an Automatic Call Distribution (ACD). The following types of ACD are required:

- Ring all
- Ring all with conference (Rings all call takers, as each answers, they are joined in the conference)
- Priority
- Round robin
- Longest idle

Each local PSAP will work with the vendor to specify their ACD configuration.

3.2.6.14 Wireless Compatibility
The solution shall be Wireless Phase I and II and NG compatible per FCC requirements.

3.2.6.15 Fault Tolerance
The Offeror shall describe their solution architecture with respect to the major components or modules, and describe how the solution will react to a failure of each major component or module. The solution shall not contain a single point of failure.

3.2.6.16 Power Distribution

Describe how power at each controller site is delivered to the equipment such that the failure of a single power feed will still allow the controller to function without loss of ability to process calls.

3.2.6.17 Legacy Network Gateway/Legacy Public Safety Answering Point Gateway

Given the mission-critical nature of the system and the various interfaces that need to be supported now or in the future, redundant legacy gateways shall be supported. It is anticipated that the final implementation of the system will support few LNG, however it is understood that during the initial transition period, all PSAPs shall be able to process calls.

The Offeror shall describe the design of the interfaces and means to support legacy systems, providing the same redundancy as fully transitioned locations.

3.2.6.18 Protocols

The solution shall use TCP/IP network connectivity and client/server network design. Calls shall be transported as VoIP between the controller and the remote workstations. Signaling for IP connected calls shall be SIP based. Bridging is used in NG9-1-1 to transfer calls and conduct conferences.

3.2.6.19 Bandwidth

The Offeror shall state the bandwidth requirements for workstations and remotely connected lines and trunks. It is highly desirable that bandwidth requirements per workstations be minimized while still utilizing G.711 codec.

3.2.6.20 Call Associated Signaling and Non-Call Associated Signaling

The controller shall be compatible with eight, ten and twenty-digit ANI delivery, and non-call associated signaling (NCAS) solutions

3.2.6.21 Administrative Lines/Non-Life Threatening Emergency Lines

The controller shall interface with PSAP's administrative lines. Caller-ID functionality with name or name and number delivery shall be provided on all administrative telephone line interfaces. Centrex style administrative circuits will be supported with either three digit or four digit Centrex functionality.

Administrative or ten digit emergency lines as designated by each PSAP may terminate on the workstations with caller ID functionality with name or name and number delivery if supplied by the carrier. Lines terminating on the workstations can not appear on a Private Branch Exchange (PBX) or be answered from any other device. Calls needing to be transferred to another internal telephone will be done as an external transfer or using an analog port connected to the agency's PBX.

3.2.6.22 Direct Internet Protocol trunks

The proposed solution shall have the capability to terminate native IP telephony (standard SIP call) emergency and administrative calls.

3.2.6.23 Switch Administration and Maintenance

The IP based controller shall be administered, monitored and managed both locally and remotely. A 1U foldable Liquid Crystal Display (LCD) or Light Emitting Diode (LED) screen, Keyboard, Video and Mouse (KVM) unit, with enough ports to support all the devices in the rack, shall be installed on the central equipment rack(s) to allow

maintenance personnel access to servers, gateways, switches, routers and other system devices.

There shall be the single point of administration for software/firmware upgrades, Operating System (OS) and security updates. Remote administration shall also be required through a secure virtual private network (VPN) tunnel.

The Offeror shall describe their solution for administration and maintenance.

3.2.6.24 Network Security
All network interfaces connected to either a managed WAN or protected via a VPN through the public Internet shall include protection against security attacks from outsiders and insiders.

3.2.6.25 Public Safety Answering Point Firewalls
The Offeror shall specify whether their solution requires a firewall within its network design to provide security and protection to the system. If so, the proposal shall include a firewall provided for each PSAP. If a firewall is not needed, the provider shall provide a detailed description why one is not needed.

3.2.6.26 9-1-1 Trunk and Administrative Line Gateway Placement
The Offeror shall provide multiple media and emergency gateways and place these critical resources on multiple geo-diverse Ethernet switches to provide access diversity.

3.2.6.27 Ethernet Switch Configuration
The Offeror shall provide multiple managed Ethernet switches throughout the network of sufficient capacity to allow for distribution of all IP based devices across such switches in such a fashion to minimize the impact of the loss of one Ethernet switch to the network and the operation of the remote PSAPs.

3.2.6.28 Remote Automatic Location Identification Retrieval System Interface
The ANI/ALI equipment shall interface to the ALI database provided by the ESInet provider. Each controller shall have at least two output interfaces for transmission and receipt of wireless and VoIP call data to the ALI database. The proposed solution shall have auto ALI rebid capability and shall also be configured to allow manual ALI queries. The ANI/ALI equipment shall be compatible with eight and ten digit remote database query methods. The solution shall also support advanced NENA Extensible Markup Language (XML) tags for standardized data exchange.

3.2.6.29 Automatic Location Identification Caching
The solution shall be able to store ALI data received from third-party ALI databases (e.g., telco ALI database). The solution shall send stored (cached) ALI information in response to subsequent queries for the same information providing faster ALI display on call taking workstations in the event the call is transferred to another system workstation or placed into conference.

3.2.6.30 Interface
The Offeror shall provide for NENA i3 compliant serial interfaces for the delivery of callback and location information to CAD, mapping applications and voice recorders. The solution shall be capable of delivering location information to CAD and mapping

applications natively via IP without a hardware or software upgrade being required. The solution shall also support delivery of legacy serial ANI/ALI information.

3.2.6.31 External Clock

Each controller shall be equipped with and interfaced to an external master clock in order to ensure consistency of time stamps added to event records and reports from all NG9-1-1 host equipment. Compatibility with NENA Standard 04002- v4 is required. Public Safety Answering Points connected to the controller's network shall be able to query the master clocks via a Network Time Protocol (NTP).

3.2.6.32 9-1-1 Network Compatibility

The solution, including software, hardware and interconnections, proposed by the vendor in response to this RFP shall be compatible with the ESInet provider network infrastructure. The solution shall be able to connect to the ALI Database via IP or serial RS-232.

3.2.6.33 Virus Protection

All personal computer (PC) based machines (servers and workstations) in the network shall have virus protection software installed and functioning. The provider shall provide a mechanism to keep the virus protection up to date that is not dependent upon PSAP monitoring. The virus protection shall be updated via a centrally managed virus signature/definition server. The virus protection software shall update the virus signature/definition file daily. When the anti-virus software developer supplies notification of an update, implementation of that update shall begin immediately. An automated update process is highly recommended. Anti-virus software shall be enabled on the device at start-up and employ resident scanning. Anti-virus software shall be used to perform full system scans at least monthly. Servers and all files made available as network shares should be checked on a weekly basis. It is preferred that the Offeror have a way to test and approve the virus signature/definitions immediately upon release to assure no negative interaction with the system.

3.2.6.34 Overflow Capability

The controller shall allow E9-1-1 calls to be routed to a designated alternate location if all primary location workstations are busy.

3.2.6.35 9-1-1 Transfers

The controller shall provide the capability for an established E9-1-1 call to be transferred by the call taker to another PSAP or some other destination compliant with NENA i3 and related standards.

3.2.6.36 Call Taking Mode

The solution shall have the ability to present inbound 9-1-1 and ten digit non-emergency calls in bridged call appearance (Service Component Architecture [SCA]) mode. Service Component Architecture mode shall display all 9-1-1 and administrative lines on the workstations and shall cause all workstations to signal an incoming call with an audible and visual indication. The call shall be delivered to the first call taker who "answers" the ringing call.

3.2.6.37 Selective Transfer

The controller shall be able to provide the capacity for access to a minimum of six (6) emergency service providers for each Emergency Service Number (ESN). This capability will allow a call taker to transfer a call to an agency and establish a conference call.

3.2.6.38 Abandoned Call Information

The controller shall be capable of collecting the ANI digits and processing the ALI lookup regardless of the condition of the call: active or on-hook. The controller shall collect the digits immediately after applying battery to the 9-1-1 trunk and then process the ALI lookup. The ANI of the abandoned caller shall be available for viewing by the call taker and the abandoned call shall remain in queue with still active 9-1-1 calls. However, it shall be possible to sort the calls in queue to meet the requirements of PSAP protocols.

3.2.6.39 Automatic Call Detail Record

The controller shall capture, and store, all available information pertaining to each 9-1-1 call on the application/telephony virtual server and be accessible to the Management Information System (MIS) package for reports.

3.2.6.40 Redundancy

The solution architecture shall be such that the failure of any one component or module will not result in total system failure, but only the loss of the equipment associated with that module. All vital system modules shall be protected through the use of redundant modules to assure single point failure tolerance.

3.2.6.41 Flexibility

The proposed solution shall have the demonstrated ability to effectively manage and process a variety different call formats including:

- Traditional analog or digital telephone calls
- Wireless calls in compliance with the FCC Phase 1 and Phase II mandate for full call integration
- VoIP in native format in compliance with the emerging NENA 13 standard
- Telematics

As standards are developed, the proposed solution shall have the demonstrated ability to manage and process the call formats including:

- Video
- Instant Messaging (IM)
- Voice over Instant Messenger (VoIM)
- Short Message Service (SMS), "Cellular Text"

3.2.6.42 Central Equipment

All controller equipment shall be rack mounted in a standard 19 inch rack. The rack shall be securely mounted to the floor and properly grounded. The rack shall have dual power supplies. The Offeror shall provide the power requirements needed within the facility to include type of output receptacle.

3.2.6.43 Maintenance Printing - Equipment Room

The equipment room requires a maintenance printer to assist service provider's maintenance personnel when printouts are a necessity.

3.2.6.44 Network Printing and Printer

The PSAP must be equipped with a networked laser printer that supports both black and white, as well as color printing requests from all CPE and MIS workstations. The networked laser printer must be included and specified in the Offerors proposal. The printers included in the proposal must include the following functionality:

- Capable of network connectivity
- Minimum of printing 35 pages per minute (ppm)
- Capable of printing a minimum of up to 4,000 pages per month

- Ability to print on legal- and letter-sized paper
- Minimum of 1200 dpi x 1200 dpi black resolution

3.2.6.45 Maintenance Access - System Reconfiguration

On-site and off-site personnel shall be able to remotely access the PSAP and be able to perform, at minimum, the following tasks:

- Modify the answering positions parameters
- Modify the user login ID information and permission
- Modify the 9-1-1 trunk parameters
- Modify the CO line parameters
- Modify the ring-down line parameters
- Assign a module or a port to give the user the ability to:
    - View quickly a multitude of system settings for each entity (9-1-1 trunk, user, etc.)
    - Reconfigure advanced settings to adapt the system to the exact requirements of a particular setup without technical assistance from the manufacturer
    - Customize the system according to the operational preferences of each PSAP
    - Upgrade the system for new or expanded uses
    - Safeguard the system by backing-up the system database
    - Troubleshoot the system

3.2.6.46 Future Expansion

The solution described in these specifications shall be capable of meeting today's needs, as well as future expansion in order to meet anticipated future growth. Future expansion, as mentioned in this RFP, shall not require replacement of any equipment. The solution should be installed with adequate wiring, processor and hardware to meet this growth.

The Offeror shall state the expansion capability of their equipment, describing the overall solution capacities including the number of incoming 9-1-1 trunks, the number of answering positions, the number of telephone lines.

3.2.6.47 Call Detail Records

The solution shall provide CDR for all calls including VoIP calls. The solution shall provide QoS information, per NENA i3 standards, for each call to ensure that SLAs are being met. Quality of service information should be accessible through the Offeror's maintenance function.

3.2.6.48 System Diagrams

The Offeror shall provide diagrams for their proposed solution in Microsoft Visio showing:

- System connectivity
- System NG9-1-1 functionality including connectivity to network
- Intelligent workstation equipment
- PC hardware requirements

The intelligent workstation shall be state-of-the-art, digital technology workstations with industry standard keyboard and mouse. The intelligent workstation shall be equipped with all necessary audio and video interface equipment to include keyboard, mouse, speakers and a 22 inch flat panel monitor.

3.2.7 Personal Computer Specifications

The intelligent workstation shall have the following minimum specifications or equivalent:

- Specification for Standard Business Class Desktop
- Intel Core i5-2400 Processor (6M Cache, 3.10 GHz, 4 cores, 4 threads)
- Label Intel Core i5
- Chipset Intel Q65 or Q67 Express
- Memory 4GB DDR3 (2DIMMs x 2GB) PC3-10600
- Dual Video Graphics Dual video card; Integrated Intel HD Graphics 2000/ or separate
- Network Adapter Gigabit Ethernet Controller
- Hard Drive 250GB 7200 RPM SATA
- Optical Drive DVD+/-RW SATA
- Back Panel Network, Line-In, Line-Out, USB 2.0/3.0, VGA, DVI-I, Display Port
- Connectors OPTIONAL: Parallel and Serial
- Security Features Computrace in BIOS
- TPM 1.2 Chip
- Environmental 80 Plus Power Supply Silver or Gold Rating
- Compliance EPEAT Silver or Gold Rating
- Energy Star 5.0 Certification
- Operating System Microsoft Windows 7 Pro 32-Bit or 64-Bit
- Power Supply Dual power supply required for each workstation
- Uninterrupted Power Required for each workstation

The final selection of the make and model of the workstations shall be approved by the State.

3.2.8 Portable Keypad

It is desirable for the workstation to be equipped with a 12 to 24 key programmable keypad that will allow the call taker to perform basic system function without using the computer keyboard.

3.2.9 Headset/Handset

The Intelligent Workstation shall provide an analog audio interface to a headset/handset and to the radio system arbitration unit to accommodate both radio and 9-1-1 audio in the same headset/handset.

3.2.10 Radio Integration

The Intelligent Workstation shall be capable to interface/integrate with the respective radio system. Call takers shall use the same headset for both radio and telephone conversations.

3.2.10.1 Instant Recall Recorder - Instant Recall Recording

The solution must be capable of supporting Instant Recall Recording functionality in the workstation.

3.2.10.2 Instant Recall Recorder - Station Call Recording Storage

Instant Recall Recorder must be accessible by an easy to use Windows™ interface and must provide a minimum of eight hours of recording time.

3.2.10.3 Instant Recall Recorder - Erase of Old Calls

An option to erase all old calls on a timed basis or when the disk drive in the PC console reaches a certain percentage of full must be provided.

3.2.10.4 Workstation Logging Recorder Interface

Each workstation is required to provide an adjustable audio output to the logging recorder system in order that audio level can easily interface to a number of logging recorder systems. This interface is required to mute when the workstation is not active, so that background conversations are not offered to the logging recorder. It is the required responsibility of the Offeror to terminate the logging recorder interface to a telephony style block, which must be located in the equipment room near the existing logging recorder interface blocks.

A minimum of one analog output must be provided for each workstation to the logging recorder to allow for the recording of all telephone conversations handled by the call taker. The proposal must include the cabling of the output to a demarcation point near the current interface for the PSAP logging recorder.

3.2.10.5 Workstation and Computer Aided Dispatch Dedicated Wiring

Offeror is responsible to provide dedicated CAD port jacks near the PSAP-owned CAD, logging recorder and third-party mapping equipment.

Console jacks and cabling must be provided by the Offeror in this RFP. The wiring runs that are to be provided must be terminated to patch panels in the telephone room of each PSAP. A total of six jacks must be terminated at each 9-1-1 workstation. Four of the six jacks will be wired to the TIA/EIA 568B standard. The remaining two cables must be connected to RJ-11 jacks.

The jacks must be labeled clearly at each branch location; and the jack number must match the position number where it is located. For example: workstation one must have jack number one installed. The jacks themselves must be labeled A through F and correspond with the patch panel located in the equipment room or wiring closet.

The jack that is labeled as "F" is the RJ -11 that is reserved for voice logger applications and will be terminated on a telephony style block. The jack that is labeled "E" is the RJ -11 that is reserved for telephony applications that will be required.

Please state the wiring that will be required to support the workstations; it is our intent to have surplus structured wiring available at each workstation for potential future applications.

3.2.10.6 Radio Channel Recording (Required Option)

The ability to also record the selected (1) radio channel in addition to 9-1-1 workstation voice traffic simultaneously is required. Please respond how the proposed solution meets or exceed this requirement.

3.2.10.7 Instant Recall Recorder - Call Type/Text Information

All recordings must indicate the type of call (9-1-1 or administrative) and allow the call taker to enter textual information about the call, if desired. For 9-1-1 calls, the ANI of the caller must be automatically stored with the call recording.

3.2.10.8 Instant Recall Recorder - Separate Recording and Playback

In addition to data captured on logging recorders, the solution must provide separate functionality for recording and playing back all calls, voice, Teletype (TTY) and Telecommunication Device for the Deaf (TDD) for the previous eight hours of operation. Playback functions must occur within one second of a minimal number of keystrokes or

mouse clicks. Describe in detail how your solution records the various call types and how to retrieve them.

3.2.10.9 Instant Recall Recorder - Recording Storage
The voice recording must be physically stored on the local hard drive in an individual file for each call.

3.2.10.10 Instant Recall Recorder - Recorder DVR Controls
The Instant Recall Recorder (IRR) is required to provide DVR -like controls. The user must have the ability to mark and move to any portion of the call.

3.2.10.11 Instant Recall Recorder - Speaker Interface - Recall Recorder
The workstation must provide two jack boxes and an output port for an interface to an external speaker at the position. This must allow the call taker to playback the IRR to the speaker port, or headset/handset ports.

3.2.10.12 Instant Recall Recorder- Recall Recorder Minimum Features
At a minimum, the IRR must provide the following features: • Play • Pause • Stop • Play forward/fast forward • Rewind • Repeat • Forward file to another position • Display ANI • Display Calling Line ID (if available).

3.2.11 Computer Telephony Integration Software Requirements
The screen layout shall be highly customizable. The 9-1-1 client application shall be a true soft phone and operate independent of any associated telephone instrument. If a fault occurs in the application or PC while a call is active, another operator shall be able to take over the call.

3.2.12 Call Taker Log-on
The solution shall require users to manually log-on with a username/password combination. Upon successful completion of the log-on, each call taker will be presented with a selection of pre-configured roles. The screen layout presented to the call taker shall be based on a user/role combination. If a user/role combination has not been defined for the call taker, then the screen layout presented to the call taker shall be based solely on the selected role. If a role has not been assigned to the call taker, the default user/default role layout shall be presented. Call takers shall be able to log-on at any position and be presented with the identical screen layout associated with the selected role.

3.2.13 Position Software Update
At logon, the server shall verify the Intelligent Workstation's software version against its own cached Intelligent Workstation software version. If a newer version of the software exists on the server, the user shall be notified of the update or prompted to upgrade the software which shall then be completed automatically by the server.

3.2.14 Calls
The Intelligent Workstation shall include emergency calls and be capable of integrating ten-digit lines.

3.2.15 Call/Line Indicators
The Intelligent Workstation shall indicate incoming emergency and non-emergency calls by both audible and visual means. The 9-1-1 trunks shall have a different audible and visual signal from other lines. The Intelligent Workstation shall also have the ability to visually display the status (connected, ringing or on hold) of each emergency and non-emergency call.

3.2.16 Routing Status
It is desirable that the Intelligent Workstation be capable of providing a visual display of the routing status of the call:

- Normal - the first attempt to route the call was successful
- Overflow - the first route was busy or congested
- Alternate - the first route attempt failed and another route was attempted
- Transfer - the call was transferred
- Not Available - no routing status was received

3.2.17 System Sounds and Icons
The Intelligent Workstation shall allow a supervisor to modify the system sounds and button icons.

3.2.18 Graphical User Interface
The Graphical User Interface (GUI) shall allow for personalized screen layout and shall consist of a number of windows, each of which can be located and docked in a position on the screen deemed most optimal by the supervisor.

3.2.19 Help Documents
A user friendly searchable help file shall be installed on each workstation.

3.2.20 Screen Layout Lock
The screen layout shall be automatically locked when the call taker logs into the answering position.

3.2.21 Screen Layout Restore
The supervisor shall have the capability to restore the original screen layout while making modifications.

3.2.22 Print Capabilities
The Intelligent Workstation shall provide an interface port for manual printing of location and TDD/TTY conversation or other media upon call release. It is required that the Intelligent Workstation send print jobs to a network printer.

3.2.23 Status Windows
The Intelligent Workstation shall present the call-taker with the status of the following categories:

- Number of Active 911 Calls
- Number of 911 Calls on Hold

- Number of 911 Calls Ringing
- Number of Active Call takers

The numbers shall be summarized and presented. Call takers shall be able to open up windows for each status category to obtain more information about calls in each category:

- ANI
- Trunk
- Position
- Call Taker
- Start Time

3.2.24 Automatic Number Identification

The Intelligent Workstation shall provide visual display of the emergency caller's telephone number and any i3 compliant standards.

3.2.25 Automatic Location Identification

The Intelligent Workstation shall provide visual display of the calling party's street address information based on legacy ANI and ALI and any i3 compliant standards. The Intelligent Workstation shall also be capable of extracting geographical coordinate information from the ALI file received and transmitting this information to geographical mapping software with i3 standards.

3.2.26 Wireless Call Handling

The Intelligent Workstation shall present wireless calls and shall include all standard call-handling features. Single step wireless callback is mandatory as the call taker shall not be required to perform a manual ANI callback for wireless calls.

3.2.27 Telecommunication Device for the Deaf/Teletype

Next Generation 9-1-1 anticipates that deaf and hard of hearing callers will migrate from TTY to other forms of communication including real time text devices and various forms of relay. Although use of TTY is expected to decline, it cannot be assumed that TTY will be completely gone by the time transition to NG9-1-1 is complete. Therefore, PSAPs shall be capable of receiving calls from TTYs. As it cannot be ensured that all audio calls will transit a transcoder, the PSAP Intelligent Workstations will need to recognize baudot tones and display text, as well as accept typed text and generate baudot tones on either 9-1-1 calls or ten-digit emergency lines. The Intelligent Workstation shall allow operators to communicate with TDD/TTY callers directly from their 9-1-1 Intelligent Workstation keyboard, without requiring the use of any external device. Additional specifications are as follows:

- Operators shall be capable of manually connecting to emergency calls originating from ASCII- type TDD/TTY equipment, as well as originating both baudot and American Standard Code for Information Interchange (ASCII) calls from their answering position. The Intelligent Workstation shall allow users to store and access (send) a minimum of twenty (20) pre-programmed TDD/TTY messages, as well as to print the previous TDD/TTY conversations.
- The operator shall have the ability to create a conference between the TDD/TTY caller and up to four (4) non-TDD/TTY parties either in 9-1-1 call-taking mode or administrative call-taking mode.
- The TDD/TTY function shall allow an operator to transfer a TDD/TTY call to another operator position.

- The TDD/TTY function shall allow the operator to alter its operation to comply with Americans with Disabilities Act (ADA) requirements for Hearing Carry Over (HCO) and Voice Carry Over (VCO) calls.
- The two-way TDD/TTY conversation and text information shall also be stored on the Application/Telephony Server.

3.2.28 Call Review

The Intelligent Workstation shall allow the call taker to view the information of at least the last ten calls released at the answering position.

3.2.29 Instant Messaging

Instant messaging shall be available from each PSAP workstation and be configurable or disabled according to individual PSAP requirements. Each workstation shall have the ability to send an instant message to any other workstation on the system.

3.2.30 Automatic Location Identification Rebid

The Intelligent Workstation shall automatically update location information at regular intervals. This feature shall be configurable by each PSAP as to the number and frequency of intervals on a per wireless provider basis.

3.2.31 Automatic Location Identification Parsing

The Intelligent Workstation shall guarantee that ALI data is appropriately and consistently displayed when interfacing with different ALI providers that send their information in various formats (e.g. wireline versus wireless). The solution shall provide a method for formatting the ALI for calls with 20-digit ANI CAS and 10-digit NCAS so the Calling Party Name (CPN) appears in the same location as it does for landline calls. This formatting or "normalizing" shall provide the CPN to the ANI callback list for CAS and NCAS calls received.

3.2.32 Conference

The Intelligent Workstation shall provide the call taker the ability to remain on a call and add a new party to the conversation without putting the caller on hold—the caller must remain on-line at all times. The solution shall allow for up to 10 simultaneous conferences of up to 10 parties each. Any party shall be able to drop out of the conference; leaving the others talking as long as at least one of the other parties possesses supervision on their connection. Call takers shall be able to mute any participant in the conference and shall be able to exclude any participant from hearing other parties in the conference to allow for private consultation. The status of the call shall be presented visually in a window that also shows the status of all other calls at the workstation (active, abandoned, on hold).

3.2.33 Speed Dial - Contacts

The call taker speed dial shall allow the call taker to quickly access frequently called telephone numbers from a pre-programmed list of contacts. Preferred example, the call taker shall simply double click on the on the contact in order to initiate the speed dial.

3.2.34 Speed Dial - Icons

The call taker shall be allowed to initiate a speed dial simply by clicking on an icon which has been preconfigured with the telephone number. It shall be possible to group speed dial icons in a logical manner. It shall be possible to initiate a speed dial conference with the single click of a speed dial icon.

3.2.35 Star Codes
The call taker shall be allowed to transfer calls and contact other State PSAPs utilizing a list for pre-programmed star codes standardized across all State PSAPs.

3.2.36 Callback
The Intelligent Workstation shall have the ability to callback a 9-1-1 caller by dialing the ANI received during the E0-1-1 call setup. The Intelligent Workstation shall provide a single feature key to perform this operation. Manual dialing of the number by the call taker shall not be necessary. The callback of emergency TDD and wireless calls should be performed in the same manner.

3.2.37 Hold
The answering position Intelligent Workstation shall allow the call taker to place up to five 9-1-1 or administrative calls on hold with a single keystroke or mouse click. The controller shall store the ANI/ALI information while the call is on hold, hence avoiding repetition of the ALI request.

3.2.38 Forced Disconnect
Call takers shall be capable of releasing an existing E9-1-1 call at any time, regardless of whether the calling party has hung up.

3.2.39 Muting
Call takers shall have the ability to block a caller from hearing and talking with the remaining parties in the conference.

3.2.40 Monitor
Any authorized call taker or supervisor shall have the ability to silently listen to another call taker's telephone conversation from his/her workstation. Such action shall not cause any audio or visual disturbance at the monitored answering position.

3.2.41 Barge-In
The Intelligent Workstation shall give the call taker the ability to barge into an existing call by clicking on the appropriate circuit indicator on their screen or pressing the appropriate line appearance on the telephone. Upon entering any 9-1-1 or administrative call for which ANI/ALI or caller-ID information is available, such information shall be immediately displayed on the call taker's display. A minimum of six participants shall be able to use the barge-in feature on a single 9-1-1 call.

3.2.42 Make-Busy
Call takers, with appropriate system permissions, shall be capable of temporarily removing themselves from a ring group (call queue) in order to conclude a previous call or perform another

task such as radio dispatched while remaining logged on. Call takers shall have the ability to click a single "Make Busy" icon to remain logged on but not in a queue to receive calls.

3.2.43 Management Information System/Reporting

The Offeror shall provide a comprehensive management and statistical reporting functionality to the PSAP management personnel with real-time and historical information. It shall be user friendly, customizable and capable for generating reports for varying time periods. The solution also shall be able to auto-schedule the generation of predefined reports. The vendor shall include one black and white networked laser printer per PSAP.

3.2.43.1 Reports

As a minimum, the following information shall be readily available for reporting purposes:

- ANI/ALI/Location Information
- Seizure time
- Position answered
- Answer time
- Disconnect time
- Incoming trunk number
- Total count of call type(s) such as but not limited to wireline, wireless, VoIP call types.
- Average call waiting
- Average call duration
- Duration of transferred calls
- Number of calls transferred to each PSAP
- Total number of times a caller is transferred and to which PSAP(s)
- Total abandoned calls
- Calls by incoming trunk
- Call by hour of day
- Calls answered by position
- Calls answered by all positions
- Calls answered by each PSAP
- Call answered by user ID

3.2.43.2 Data Integration

The reporting interface shall be capable of integrating multiple databases into one report with the ability to add attachments to the call record.

3.2.43.3 Data Analysis

The solution's reporting capabilities shall be designed to enable authorized users the ability to drill up/drill down and slice/dice the information to enable various agents, managers, supervisors and executives to answer virtually any telecom question in exactly the level of detail necessary to support a given administration decision. The solution shall provide comprehensive management and statistical reports for all and individual PSAPs/jurisdictions.

3.2.43.4 Report Manager

The report manger shall be able to save a customized report for quick access, such as a browser type favorite for execution.

3.2.43.5 Report Parameters

Automatic Number Identification/Automatic Location Identification, location information and other information as i3 standards are developed shall be captured and stored with each 9-1-1 call. The following items from the ANI/ALI data stream shall be captured and stored in their own individual database fields of appropriate size that is sortable and searchable and as i3 standards are implemented that ability to capture and to comply with i3 standards:

- Originating phone number (ANI)
- Address or coordinate (ALI)
- Caller name
- ANI/ALI time of Initiation
- ANI/ALI time of pickup
- ANI/ALI time of disconnect
- ANI/ALI date
- ESN
- Class of service
- Carrier

3.2.44 Administration, Alarms and Reporting

3.2.44.1 Administration

Administration shall be a Web browser or client application that provides the maintenance functions required for the 9-1-1 specific functions implemented by the controller. These functions include:

- Tandem transfer code configuration
- Outgoing trunk configuration
- User configuration
- ALI configuration
- Resources configuration
- Services configuration
- Speed dial numbers
- Agency information

3.2.44.2 Self-Monitoring

The solution shall be capable of self-monitoring vital processes and sending alarms in the event of an alarm condition. The solution shall notify key personnel and real-time notification to the vendor's 24-hour technical maintenance and support center upon detection of an alarm and give a brief description of the alarm condition.

3.2.44.3 Remote Access

The solution shall provide maintenance personnel the capability to query the system locally and remotely through an internet connection via a VPN as to the fault(s) and its affect on the system. Alarm history queries, reporting and printing shall be available.

3.2.44.4 Alarm Categories

There shall be a minimum of three categories of alarms (major, critical, minor) depending upon the criticality of the event. It is desirable for the solution to allow the administrator to configure notification thresholds. The types of alarms are defined as follows:

- Major failures are major system failures that render the system completely unusable or significantly reduce system operability, and are considered to be operationally unacceptable by the State.
- Critical failures indicate a severe, service affecting condition has occurred and that immediate corrective action is imperative, regardless of the time of day or day of the week. Escalation to top level personnel is immediate and required.
- Minor failures are minor system failures that minimally reduce system operability or have little or no effect on system operability and usability, and are considered to be operationally acceptable by the State.

The solution shall be capable of sending email notifications of alarm conditions to maintenance personnel. The email notification shall summarize the Simple Network Management Protocol (SNMP) trap which triggered the alarm condition.

3.2.45 Installation

3.2.45.1 Completion

South Dakota's goal is to complete the design, implementation and installation of a complete functional system and achieve full production operations within 18 months after contract award. South Dakota understands that implementation will be in a phased approach with controller systems and workstations being implemented over several months.

The Offeror shall submit an Implementation schedule to include a guaranteed schedule under which the solution will be implemented and delivered and complete transition to production operations will be achieved. The schedule shall breakout completion of the installation of each controller equipment, network connections, workstations, mapping, MIS, etc. The successful Offeror is responsible for furnishing and installing all equipment and cabling required for the proposed solution.

3.2.45.2 System Grounding

System grounding shall comply with industry standards and engineering practices.

3.2.45.3 System Power

The system shall operate from standard 115V, 60 Hz, single-phase power. The Offeror shall state their power requirements for the backroom equipment and each workstation. The State requires the successful Offeror to supply UPS backup power to support the proposed solution.

3.2.45.4 System Build Out

Specifics about the Offeror's intended process for the solution implementation shall be included as part of the response to this RFP. All work shall comply with the applicable national, state and local codes and regulations.

3.2.46 Training

3.2.46.1 Training Requirements

Training on all system functions shall be provided by the Offeror prior to acceptance of the system. Training shall include sufficient information and training to familiarize personnel (administration and supervisors) with all system functions, features and

operations for their particular assignments. The successful Offeror shall implement a train-the-trainer plan for call takers and PSAP administrators.

The Offeror shall describe their plan to meet this requirement.

3.2.46.2 Training Curriculum

The successful Offeror shall provide a training curriculum for call takers, administrators and State training instructors. The training curriculum shall include instruction on all aspects of the PSAP/Intelligent Workstations, including but not limited to the following:

- Call Taking
- System Administration and Customization
- Reporting

The Offeror shall describe their plan to meet this requirement.

3.2.46.3 Training Material

Training materials for call takers, administrators and training instructors shall be approved by the State prior to the delivery of any training. Training materials shall become the property of the State. Participants shall receive individual printed copies of applicable training materials at the time the course is conducted. Authorization shall be granted to reproduce these and any subsequent training materials that are provided. It is a requirement that sufficient copies of the controller system end user training documentation and copies of administrative training documentation be included in this project on CD, DVD or similar media in addition to paper for each participant. A minimum of five copies of training materials shall be available per workstation position for call takers.

3.2.46.4 Training Schedule

The training schedule shall be approved by the State.

3.2.47 Engineering and Project Management

3.2.47.1 Engineering Responsibilities

The Offeror shall describe:

- All cabling for connectivity among the controllers
- All cabling for connectivity to the demarcation point for Centralized Automatic Message Accounting (CAMA) trunk and admin line connections
- All cabling for connectivity to the ALI source
- Backup power source needs for each potential host site
- Climate control needs at each potential host site
- Space requirements, security, limited access and fire protection needs at each potential host site
- Disaster Recovery capabilities

3.2.47.2 Project Manager

It is required that the successful Offeror assign a project manager who is familiar with 9-1-1 networks and IP networks, as well as the proposed solution. It is a requirement that the proposal include the project manager's resume with references and experiences on similar projects.

3.2.47.3 Project Plan

The Offeror is required to submit a task-oriented Gantt chart detailing the solution installation utilizing MS Project 2000 or a later version. The proposed start date for the project shall utilize a "contract date" for competitive and demonstrative purposes. The project plan shall identify critical dependencies and expected timelines.

3.2.48 Acceptance Testing

The State will accept a written acceptance plan created after award of the contract and adaptable based on the equipment selected. The State will make additions to this acceptance plan based on the solution selected. The State will not accept or certify the equipment until all items on the acceptance test plan are met to the satisfaction of the State. The successful Offeror will be responsible for all materials, hardware and software provided until subject items have been delivered, implemented, tested and accepted by the State. The successful Offeror shall certify in writing to the State when the system is installed and ready for testing. Degrees of system failure and operability for acceptance testing purposes are determined solely by the State. All pre-installation procedures and checklists will be completed and documented by the successful Offeror and reviewed by the State.

3.2.48.1 Failure Levels

The following failure priority levels are defined for use during the Systems and Acceptance Testing process.

- Major failures are major system failures that render the system completely unusable or significantly reduce system operability, and are considered to be operationally unacceptable by the State.
- Critical failures indicate a severe, service affecting condition has occurred and that immediate corrective action is imperative, regardless of the time of day or day of the week. Escalation to top level personnel is immediate, and required
- Minor failures are minor system failures or open punch list items that minimally reduce system operability or have little or no effect on system operability and usability, and are considered to be operationally acceptable only during the acceptance testing phase by the State.

3.2.48.2 Final Acceptance Testing

Final acceptance testing is expected to commence immediately upon system implementation and proceed for fourteen (14) consecutive major/critical alarm failure free days. If a major/critical failure occurs during the final acceptance testing period, the final acceptance testing period will be stopped, and the failure or failures expediently fixed to State's satisfaction. Response times to failures shall meet the requirements defined for the warranty period. During this period of interruption, the system shall continue to operate with the greatest degree of reliability possible given the respective failure(s). The final acceptance testing period of fourteen (14) consecutive failure free days will restart at day one the day after repairs are resolved, at State's sole discretion.

3.2.48.3 Measurable Testing

Testing shall include a measurable testing process for each functional and technical aspect of the specifications listed in the Offeror's proposal, and solution performance measurements based on the telephone activity to date in State's PSAPs and power failures. This testing serves as a sign-off process for payment to the Offeror.

3.2.48.4 System Failures due to External Causes

In measuring acceptance, system failures resulting from external causes, including but not limited to acts of God, fire or State or PSAP supplied hardware, software or connectivity failure, will be excluded from the acceptance testing.

3.2.49 Maintenance Requirements

System Maintenance periods for all hardware, software and on-site maintenance shall begin upon final acceptance of the entire system and shall run concurrently for a period of ten years. The ten year period shall be included in the base price.

The successful Offeror shall guarantee the availability of service assistance ten (10) years after final acceptance by the State. Twenty-four hour technical and maintenance support shall be available with a response time, on site, of no more than two (2) hours for major failures. This support shall be available 7x24x365. A complete listing of all warranties including systems and equipment, detailing what is included and what is not included shall be provided. The vendor shall specify the number of trained technicians locally available.

3.2.50 System Options

The Offeror shall offer the following mandatory options and detailed pricing for such options from the basic solution pricing.

3.2.50.1 Portable Workstations

The Offeror shall demonstrate the ability to increase the current number of workstations. The proposed solution shall be capable of being temporarily increased to handle short-term increases in projected call volumes (natural disasters and special events) through the use of a ruggedized portable "suitcase" workstation minimally consisting of: ruggedized laptop, headset, AC power adapter, DC power adapter, CAT5e, or better, Ethernet patch cord (lOft). The portable workstation shall be capable of full functionality.

The Offeror shall provide unit pricing for optional portable workstations and any additional associated costs.

3.2.50.2 Private Branch Exchange

If a fully functional PBX is not included in the base controller proposal, the provider shall provide pricing for a full feature PBX. Include a description of the features available in the PBX and information on whether it is embedded or a separate interfaced product.

3.2.50.3 Emergency Notification System

The Offeror shall provide pricing for an optional Emergency Notification System (ENS) which will allow call takers to notify portions of the population of hazards or other conditions via mass notification. It is highly desirable that the ENS be fully integrated into the controllers so that call takers may access the ENS from the Intelligent Workstations to activate notifications. The system will utilize GIS to determine the population to be notified. The ENS shall be configurable to automatically schedule call-backs and pre-determined intervals.

3.2.50.4 Text to 9-1-1

The Offeror shall provide pricing for an optional text to 9-1-1 solution. Text to 9-1-1 allows citizens to communicate with a PSAP via text messaging. This application provides deaf, hearing and speech impaired callers with improved communication options for reporting emergencies and requesting emergency assistance. It also provides callers

under duress, such as during home invasions, kidnappings, etc. with alternate method of contacting PSAPs and emergency services.

3.2.50.5 1.11.5 Smart-phone Applications

Numerous applications are available today. These applications allow citizens to pre-load a variety of data about themselves, their medical condition, medications, emergency contacts, etc. that could be shared with PSAPs and responders if or when the person makes a 9-1-1 call. Such applications may also allow 9-1-1 callers to share pictures and videos they may have of suspects and incidents with the PSAP while talking to 9-1-1 dispatchers.

The Offeror may provide (not mandatory) pricing for optional smart-phone application interface.

3.3 Managed Network Services

3.3.1 Operations Requirements and Assumptions

The Offeror shall provide managed services and be required to establish practices and procedures for performing its functions on behalf of the State. The Offeror will be required to track its activities utilizing a suitable tracking system that will preserve and document all activities. These activities include but not limited to:

- Network Management
- Capacity Management
- Change Management
- Configuration Management
- Implementation Management

The Offeror will be the single point of contact for change management for emergency services call and information delivery in the State. They will provide these services 7x24x365. They will provide staffing to meet these requirements.

The management requirements have been separated into three major components:

1. Oversight of the ESInet (application layer) service
2. Oversight of the IP network (layer 3 and 4 services), and
3. Host/Remote Controllers and workstations

The requirements related to these oversight functions are outlined below.

1. Oversight of the ESInet network service

A. Maintain a database of service providers to include,
   a. Contact information
   b. Type of connection
   c. Network interconnection points
   d. Technical specifications and configurations such as trunk counts, types and signaling formats
   e. Other data as specified by the State.

B. Maintain a database of PSAPs that includes
   a. Contact information
   b. Equipment type, brand, model, and configuration
   c. PSAP vendors used and equipment and services provided by vendor

d. PSAP IP addresses
e. Technical specifications of equipment, such as number of ports and signaling formats
f. For SIP capable PSAPs
   i. SIP URI for 9-1-1 calls
   ii. SIP location conveyance capabilities
   iii. Media capabilities (voice, video, text)
   iv. Available codecs
   v. SIP conferencing and transfer capabilities

C. Maintain a database of PSAP vendors that includes
   a. Contact information
   b. Emergency problem resolution procedures
D. Develop and regularly update a statewide deployment plan, including
   a. PSAP identification
   b. PSAP jurisdiction
   c. Service provider identification
   d. Service provider operating area
   e. PSAP and service provider deployment schedules.
E. Develop a Change Management Process and will implement the change management process. The principles are that any change must be authorized, must have been carefully considered and planned, must be made in such a way that it does not endanger the operation of the service, that all affected parties that are or might be effected are identified and are properly informed, and that a workable plan and schedule for implementation has been developed.

   It should be noted that some changes may be relatively simple to review, plan, and implement (such as changing a destination in an existing call overflow plan) while other changes may be very complex and potentially disruptive (such as a PSAP relocation). The Change Management process developed must be able to accommodate both simple and complex changes with the required cost and effort in scale with the complexity of the change, even while protecting the integrity of the service and fidelity to the policies of the State.

   The satisfactory change management process will include, but not necessarily limited to, the following.
   a. A process for making a change or reconfiguration request. The change or reconfiguration request may originate from any stakeholder, and must be accompanied with enough information that the Offeror can determine that the request can satisfy the requirements of the change process. The Offeror is responsible for communicating the requirements for the change request to the requestor. If, in the review process, a change request cannot satisfy the requirements of the change process it may be returned to the originator to be modified and resubmitted, or rejected. If a change request is not accepted, the Offeror must provide the requestor with an explanation of the reason for the rejection, or with information on how the request might be modified so that it can be accepted. All change requests will be recorded and their disposition documented.
   b. The Offeror (or a change review officer, committee or board) must review a change request. Impacts to the network such as time, activity sequence, scheduling and cost will be carefully analyzed and the final decision will be made in accordance to approved guidelines. The review must include consideration of these items:
   i. Authorization – is the requestor authorized to make requested change
   ii. Clarity – is the purpose or goal of the change sufficiently clear to implement
   iii. Compliance – is the change compatible with the policies and goals of the State
   iv. Feasibility – is the change technically sound and can it be safely implemented without danger to the 9-1-1 service

v. Identification – All parties that will be affected by the change, or who require knowledge of the change, must be identified.
vi. Procedure – is there a standard method of implementation
vii. Recovery – if the change causes an unexpected problem is there a safe back-out/restoration procedure
viii. Resources – what resources are required to implement the change
ix. Security – are there security implications
x. Side effects – what impacts will the change have on apparently unrelated functions
xi. Test plan – what post change functions need to be verified

The review process will be recorded and documented. If a change request satisfies the review and is documented it is ready for scheduling and implementation

c. The Offeror will schedule implementation of a change that completes the review process. A schedule is set up and all identified entities will be notified. Log entries will be made to record the actual work performed and time and date of the work, and the results of the test plan. If unexpected problems or results are encountered, the recovery procedure is invoked and documented and the change is returned for additional review.
d. At the completion of a change the Offeror will update all documents and records in the management system as required by the change.

The Offeror must publish its change management procedures and make this information available to the State and to stakeholders.

F. Service provider business relation management:
   a. The Offeror will be the primary contact for all service providers. All connections (data/voice) into the system will be coordinated through the Vendor.
   b. The Offeror will document all data from service providers.
   c. The Offeror will write all State 9-1-1 service provider orders.

G. The Offeror will develop and implement a process for ALI and Selective Routing Database Management, and will maintain its own instance of these databases. The database management process must observe and implement NENA technical and operational standards. These databases must include all information required to selectively route all traffic, based on ANI or pANI information, and using the ESInet service, including wireline, wireless, VoIP, and telematics traffic, and all traffic originating from any connected service provider. The ALI information must include the actual ALI records, or, for pANI records, the ALI service provider NENA code which could be used to steer an ALI request to the appropriate ALI service provider. The Offeror will execute intercompany agreements with all service providers in order to obtain and process this data in a timely fashion and in compliance with NENA operational standards. A significant aspect of this work will be the processes or mechanisms whereby the Offeror interfaces these database processes with the service provider, who provides the selective routing functions. The Offeror will provide Selective Router database updates to the service provider in a timely fashion and in accordance with NENA recommendations.

H. Alternate and overflow routing
   a. The Offeror will develop a call overflow scheme with each PSAP in the state.
   b. The Offeror will document and test all call overflow/alternate routing configurations.

I. Call logging/stats reporting
   a. The service provider will provide the Offeror on-line access to call traffic logs
   b. The Offeror will report summaries and findings to the State quarterly, or as requested by the State
   c. Web based tracking and reporting tools are highly recommended. To include trouble ticket initiation, trouble history tracking and resolution status.

J. IP to CAMA gateways (traditional PSAP)
   a. The Offeror will;

i. Identify types of PSAP equipment, PSAP signaling format requirements and capabilities
ii. Place orders with this data to the service provider
iii. Track orders and verify installation of the IP to CAMA gateway at the PSAP
iv. Provide a test plan to the service provider

K. Monitoring and Orders
   a. The service provider has established customary and reasonable order processes so that the Offeror can place orders.
   b. The Offeror will require an IP connection to the 9-1-1 over the network for monitoring, access to databases and logs and for initiating test calls.

L. Change and reconfiguration procedures.
   a. The Offeror will establish the process for such requests. The process must be in accordance with policy established by the State and with the State contractual arrangements.
      i. Some types of changes (e.g. call overflow scheme) may have different change processes than other types of changes (e.g. pANI initial routing)
   b. The Offeror will determine authority of requestor to make the change.
   c. The Offeror will devise a plan for accomplishing the requested change. This plan must include but is not limited to:
      i. Obtaining approvals from the State and other stakeholders as required
      ii. Establishing a timeline for the change that is satisfactory to the impacted parties and in accordance with policy
      iii. Assessing the impact of the change or the reconfiguration, and assess the impact of the change process itself, on 9-1-1 operations
      iv. Providing for the mitigation of identified impacts as required
      v. Ensure that all stakeholders in the change process have been properly notified
   d. The Vendor will perform project management for the change or reconfiguration process.
      i. The Offeror will update all documents and records in the management system as required by the change

M. The Vendor will develop and present to the State for approval a Disaster recovery plan. This plan will be invoked in the event of a catastrophic failure of all, or of a significant portion of, the 9 1 1 service, and that will require substantial time to repair or to mitigate, and that will adversely impact public safety.

At a minimum, this Disaster recovery plan will address
   a. Persons or entities to be notified (e.g. officials, stakeholders)
   b. Authorized messages to be conveyed in such a circumstances
   c. Authorized actions to be or that may be undertaken by the Offeror in an attempt to mitigate the catastrophic failure
   d. Roles, responsibilities and chain of command for Offeror mitigation actions
   e. Recovery and restart procedures, involving stakeholders if needed, after the root cause of the failure has been resolved
   f. Alternative methods of monitoring or determining the status of the 9 1 1 service should the failure limit the Offeror's normal methods of IP or service monitoring

N. The Offeror will develop and publish its internal and external escalation procedures, including contact information and the chain of command.

O. IP network change procedures:
   a. The Offeror will establish the process for requests such as for a location change, bandwidth change, facility migration, CPE replacement or other activity impacting some part of the IP network. The process must be in accordance with policy established by the State and contractual arrangements.
   b. The Offeror will devise a plan for accomplishing the requested change. This plan includes but is not limited to:

i. Obtaining approvals from the State and other stakeholders as required
ii. Establishing a timeline for the change that is satisfactory to the impacted parties and in accordance with stated policies
iii. Assessing the impact of the change and the change process on network operations, and providing for the mitigation of identified impacts as required
iv. Ensuring that all stakeholders in the change process have been properly notified

P. pANI administration
   a. The Offeror will;
      i. Request pANI range assignments from the service provider or make appropriate assignments itself, as requested and as required
      ii. Maintain a database of pANI ranges and initial destination
      iii. Manage requests for pANI ranges from service providers
      iv. Contact service providers, as appropriate, to make changes

3. Future Requirements and Considerations

The State may choose to implement a Change Review Board to review and approve changes.

Appendix A provides a list of PSAPs. The State will make available to the successful Offeror an expanded matrix including call volume and current equipment details.

4.0 PROPOSAL REQUIREMENTS AND COMPANY QUALIFICATIONS

Comment [a17]: List all requirements that need to be met by the contract that are not specifically related to the actual work to be performed. This would be additional information required to be submitted with the proposal. Delete any listed requirement that does not apply to your RFP.

4.1 The Offeror is cautioned that it is the Offeror's sole responsibility to submit information related to the evaluation categories and that the State of South Dakota is under no obligation to solicit such information if it is not included with the proposal. The Offeror's failure to submit such information may cause an adverse impact on the evaluation of the proposal.

4.2 **Offeror's Contacts**: Offerors and their agents (including subcontractors, employees, consultants, or anyone else acting on their behalf) must direct all of their questions or comments regarding the RFP, the evaluation, etc. to the buyer of record indicated on the first page of this RFP. Offerors and their agents may not contact any state employee other than the buyer of record regarding any of these matters during the solicitation and evaluation process. Inappropriate contacts are grounds for suspension and/or exclusion from specific procurements. Offerors and their agents who have questions regarding this matter should contact the buyer of record.

4.3 The Offeror may be required to submit a copy of their most recent audited financial statements upon the State's request.

4.4 Provide the following information related to at least three previous and current service/contracts, performed by the Offeror's organization, which are similar to the requirements of this RFP. Provide this information for any service/contract that has been terminated, expired or not renewed in the past three years.

- Name, address and telephone number of client/contracting agency and a representative of that agency who may be contacted for verification of all information submitted;
- Dates of the service/contract; and
- A brief, written description of the specific prior services performed and requirements thereof.

4.5 Personnel Overview

A project manager will need to be identified and assigned. The assigned project manager will be made available for on-site visits for project review. If there is a change in project manager, it must be done with the approval of the State.

4.6 Subcontractor Disclosure

Full disclosure and details regarding the use of subcontractors must be clearly stated. Details should include the specific work phases that will be assigned to any one particular subcontractor. The State reserves the right to accept or reject any subcontractor proposed by the Offeror.

END OF SECTION

5.0 PROPOSAL RESPONSE FORMAT

5.1 All proposals must be organized and tabbed with labels for the following headings:

5.1.1 **RFP Form**. The State's Request for Proposal form completed and signed.

Comment [SAS18]: Is this the form on page 1?

5.1.2 **Table of Contents.** The proposal should be page numbered and should have an index and/or table of contents referencing the appropriate page number.

5.1.3 **Executive Summary.** The one or two page executive summary is to briefly describe the Offeror's proposal. This summary should highlight the major features of the proposal. It must indicate any requirements that cannot be met by the Offeror. The reader should be able to determine the essence of the proposal by reading the executive summary. Proprietary information requests should be identified in this section.

5.1.4 **Detailed Response.** This section should constitute the major portion of the proposal and must contain at least the following information:

5.1.4.1 A complete narrative of the Offeror's assessment of the work to be performed, the Offeror's ability and approach, and the resources necessary to fulfill the requirements. This should demonstrate the Offeror's understanding of the desired overall performance expectations.

5.1.4.2 A specific point-by-point response, in the order listed, to each requirement in the RFP. The response should identify each requirement being addressed as enumerated in the RFP.

5.1.4.3 A clear description of any options or alternatives proposed.

5.1.5 **Cost Proposal.** Cost will be evaluated independently from the technical proposal. Offerors may submit multiple cost proposals. All costs related to the provision of the required services must be included in each cost proposal offered.

The cost proposal must be submitted in a separate sealed envelope labeled "Cost Proposal" as outlined in section 1.7 of this RFP.

Comment [a19]: If items are renumbered, you need to double check this reference to make sure it is still correct. Delete if a sealed cost proposal is not required.

See section 7.0 for more information related to the cost proposal.

6.0 PROPOSAL EVALUATION AND AWARD PROCESS

6.1 After determining that a proposal satisfies the mandatory requirements stated in the Request for Proposal, the evaluator(s) shall use subjective judgment in conducting a comparative assessment of the proposal by considering each of the following criteria:

6.1.1 Specialized expertise, capabilities and technical competence as demonstrated by the proposed approach and methodology to meet the project requirements;

6.1.2 Resources available to perform the work, including any specialized services, within the specified time limits for the project;

6.1.3 Record of past performance, including price and cost data from previous projects, quality of work, ability to meet schedules, cost control and contract administration;

6.1.4 Availability to the project locale;

6.1.5 Familiarity with the project locale;

6.1.6 Proposed project management techniques; and

6.1.7 Ability and proven history in handling special project constraints.

Comment [skw20]: Need to put weight % in here…

Comment [a21]: These evaluation criteria are required by state law. Additional evaluation criteria, including cost, can be included at the agency's discretion.

6.2 Experience and reliability of the Offeror's organization are considered subjectively in the evaluation process. Therefore, the Offeror is advised to submit any information which documents successful and reliable experience in past performances, especially those performances related to the requirements of this RFP.

6.3 The qualifications of the personnel proposed by the Offeror to perform the requirements of this RFP, whether from the Offeror's organization or from a proposed subcontractor, will be subjectively evaluated. Therefore, the Offeror should submit detailed information related to the experience and qualifications, including education and training, of proposed personnel.

6.4 The State reserves the right to reject any or all proposals, waive technicalities and make award(s) as deemed to be in the best interest of the State of South Dakota.

6.5 Award: The requesting agency and the highest ranked Offeror shall mutually discuss and refine the scope of services for the project and shall negotiate terms, including compensation and performance schedule.

6.5.1 If the agency and the highest ranked Offeror are unable for any reason to negotiate a contract at a compensation level that is reasonable and fair to the agency, the agency shall, either orally or in writing, terminate negotiations with the Offeror. The agency may then negotiate with the next highest ranked Offeror.

6.5.2 The negotiation process may continue through successive Offerors, according to agency ranking, until an agreement is reached or the agency terminates the contracting process.

END OF SECTION

7.0 COST PROPOSAL

Comment [a22]: Describe what you are looking for as a cost proposal. If possible, provide a template for vendors to provide their costs.